SPEECH MONOGRAPHS

VOLUME I SEPTEMBER, 1934 NUMBER 1

FOREWORD

THIS first issue of Speech Monographs contains various studies selected according to the principles discussed with the Executive Council of the National Association of Teachers of Speech at its last meeting. If research is published in the name of the Association, it should have two values: (1) the dissemination of new facts and knowledge; (2) the establishment and demonstration of standards of objectivity with a high degree of scientific accuracy. The use of the word "new" in the first value means exactly that; it does not mean a culling of facts or a summarizing of data already demonstrated in allied academic disciplines. The word "scientific" is used in its broadest sense; it is not limited to any particular form of procedure. Without doubt there are other research papers by men of the Association that should be published. We hope that additional issues will follow as increasingly we turn to our own National Association for the publication of our own research.

No editorial comment on these studies is indicated or offered. As in any publication, the level of the research demonstrated in the several papers varies in scope of problem, in precision of technique, and in definiteness of results. But it is the editor's belief that these Monographs should submit to the National Association a general cross-section of the research being done by its members. Definite values may be found in a full discussion of these varied papers, whether in the form of adverse criticism or enthusiastic approval.

This idea of a cross-section of research has led to the inclusion of studies from several fields. The order in which the papers appear is roughly that of the emergence of these fields as separate studies in our total discipline. The order is in no way a reflection of the editor's estimate of their merit or significance, but is purely a chronological arrangement.

Certain individuals and groups have contributed greatly to the appearance of this publication. Professors Brigance and Travis aided in the criticism of manuscripts; the Eastern Public Speaking Conference has made a contribution of $250.00 to the cost of printing.

To the Sustaining Members of The National Association, who have waited so patiently for their return, this first issue of Speech Monographs is sincerely dedicated.

THE EDITOR.

QUINTILIAN'S WITNESSES

H. F. HARDING
George Washington University

SAMUEL JOHNSON was so deeply impressed with the merit of Roger Ascham's *Scholemaster* that he wrote in the Preface of James Bennet's 1761 edition of the book: "It contains, perhaps, the best advice that was ever given for the study of languages." A modern scholar writing on the place of this book in the history of education in the Renaissance concludes: "Had Ascham's own college, St. John's, Cambridge, founded a lectureship on education three hundred years ago, restricted to Quintilian and Ascham, the whole course of English education would have been powerfully influenced." [1] There is, indeed, good reason for joining the names of the Roman teacher and the English scholar in a review of the history of education; each wrote the most significant treatise of his age on the theory and method of teaching. Although, unfortunately, a chair such as the one proposed never was established, there is evidence enough that Quintilian's book, the *Institutio Oratorio,* or *The Education of the Orator,* has been studied and respected by English writers from the Renaissance to the present day. The proof is to be found in works on Rhetoric and Literary Criticism, in treatises on Educational Theory, Courtesy and Manners, and in the curricula of the English schools and universities themselves. In this paper I shall attempt to summon a few of the more important witnesses to the value of the *Institutio.* Their testimony will be found of two kinds: direct praise of the book, and secondly, that more complimentary sign of preference—the appropriation of Quintilian's ideas, either knowingly or unknowingly.

Marcus Fabius Quintilian (A.D. 40-*c.* 100), a Spaniard by birth, was probably the most distinguished teacher of public speaking in antiquity. His book, written after a highly successful career as a pleader and a teacher, was published in A.D. 96. Although its title implies that Quintilian writes on the training of the orator, the work is far more than a mere text-book on that subject. Rhetoric in the first century was a most comprehensive study; was in fact the organon for all learning, the principal course of statesmen and men of public affairs, embracing a knowledge of grammar, literature, reading, writing, philosophy, history, logic, persuasion, and speaking in public. Accordingly, Quintilian's twelve books, which consider the education

[1] S. S. Laurie, *Studies in the History of Educational Opinion from the Renaissance,* Cambridge, 1903, p. 83.

of a boy from birth until as a man he begins to appear in public life, comprise a treatise on educational theory, on writing and speaking, on literary criticism, and in brief, what we might today call the making of a cultivated gentleman.

The *Institutio* was known and well regarded throughout the Middle Ages, even when it could be read only in fragments. Upon the finding of a complete copy by the Florentine scholar, Poggio, in the monastery of St. Gall in the year 1416, the treatise became one of the great books of the Renaissance. It profoundly influenced writers on pedagogy, rhetoric, and poetics; and a knowledge of its doctrine was deemed essential to the scholarly equipment of every learned man.

Although the scope of this paper will be limited to witnesses from the time of the Renaissance onward, there is evidence that the *Institutio* was known in England long before Poggio's important discovery of the manuscript in full. For example, in the year 849, that notable teacher, scholar, and humanist, Lupus of Ferrières, wrote to the Augustinian Abbot of York, Altsigus, asking if he might borrow to copy, and then return, the twelve books of the *Institutio.*[2] John of Salisbury (1120?-1180) has in his *Metalogicus*[3] left us an excellent account of how such teachers as Bernard, William of Conches, and Richard l'Évêque relied upon Quintilian at the great school of Chartres (about 1050-1150). Professor C. S. Baldwin has recently shown by parallel passages not only the similarity of ideas between the *Institutio* and the *Metalogicus,* but a frequent actual use of the same words.[4]

In the Wardrobe Accounts of King Edward I for the year 1289 there is a bill for expenses at Oxford of two nephews of Edward's royal architect. Along with other items the Exchequer paid for two copies of the *Institutio.*[5]

Among important English scholars of mediæval times who studied the *Institutio,* or owned copies of it, were Adelard of Bath;[6] Richard

[2] Epistle 62 of the *Lettres de Servat Loup,* ed. by G. D. de Duzert, Paris, 1888, pp. 148-9. See also C. H. Beeson, *Lupus of Ferrières as Scribe and Text Critic,* Cambridge, Mass., 1930, p. 4.

[3] See Bk. 1, ch. 24 of the edition by C.C.J. Webb, Oxford, 1929.

[4] C. S. Baldwin, *Mediæval Rhetoric and Poetic,* New York, 1928, pp. 169-72.

[5] H. C. Maxwell Lyte, *A History of the University of Oxford,* London, 1886, 1.92-3, citing *Wardrobe Accounts, 16-18 Edw. I(4/8 Exchequer Q.R.)* and *Wardrobe Book, 18 Edw. I (Tower).*

[6] Thomas Warton, *History of English Poetry,* ed. by W. Carew Hazlitt, London, 1871, 1.180.

de Bury;[7] Humphrey, Duke of Gloucester;[8] and William Grey, Bishop of Ely.[9] There were at least three copies of Quintilian in the libraries of Oxford and Cambridge in the early part of the fifteenth century.[10]

With Poggio's discovery in 1416, the copyists at once set to work to produce complete editions of the *Institutio*. The first printed edition was published at Rome in 1470. From then until 1600 there were no fewer than 118 editions of the *Institutio* and the *Declamationes* issued in Italy, France, Switzerland, Belgium, Holland, and Germany.[11] It is true, books in these days were costly, and printings were not large, but this number of editions is proof that scholars, teachers, and pupils kept demanding the rhetoric of Quintilian. Moreover, the custom of students in the universities of taking full and detailed lecture-notes must have put into circulation a rather large number of abstracts and commentaries of the *Institutio*.

The Sixteenth Century

Let us now turn to some of the more important deponents to the value of Quintilian in the English Renaissance. Perhaps the most conspicuous figure was Erasmus. By his lecturing, his travels, his writing of books and letters, his constant communication with scholars of England and the Continent, he profoundly impressed the education of the Revival. While at Cambridge (1511-14), Erasmus became greatly interested in the efforts of John Colet to re-establish St.

[7] During the time when Richard held the Privy Seal he defended the monks of St. Albans in their controversy with the townspeople over the ownership of certain tracts of land. In gratitude, the Abbot, Richard de Wallingford, presented to the famous collector four choice volumes, among them a copy of Quintilian. F. S. Merryweather, *Bibliomania in the Middle Ages*, New York, 1900, p. 121.

[8] Shortly before he died, Humphrey, the uncle of Henry VI, gave to the library at Oxford, a large number of valuable books, including seven volumes of Cicero's works, and a copy of Quintilian. Maxwell Lyte, *Op. cit.*, 1.321.

[9] Grey willed over two hundred manuscripts to the library of Balliol College, "including hitherto unknown orations and treatises by Cicero and Quintilian." J. B. Mullinger, *A History of the University of Cambridge*, Cambridge, 1884, 1.397.

[10] Besides the copies just mentioned, the cataloguer of Peterhouse College in 1416 listed a copy of the *Institutio*. See Rev. T. A. Walker, "English and Scottish Education" in *Cambridge History of English Literature*, 2.415.

[11] A complete list of editions of Quintilian down to 1810 is included in Lemaire's edition of his works in *Bibliotheca Classica*, Paris, 1825, 7.277-300.

Paul's School. Henry VIII had granted to Colet a royal license-in-mortmain for the school in 1510. In the following year Erasmus wrote and dedicated to Colet for his use in the school the *De Copia Rerum et Verborum*. Professor W. H. Woodward points out that the very title of the *Copia* comes from Quintilian and says:

> It is a manual of 'enrichment' and 'variation' based mainly upon Quintilian [Book 8], with modern examples. . . . A student of the classical Renaissance, desirous to make a first-hand acquaintance with the art of expression as understood by humanist writers, cannot do better than make a careful analysis of the *De Copia*, reading side by side the *De Oratore* and the fourth and eighth books of the *Institutio Oratoria*.[12]

In his treatise on the curriculum, *De Ratio Studii* (1511), Erasmus again shows his dependence upon Cicero and Quintilian. Their works are prescribed for the advanced study of Rhetoric. Many of the authors mentioned in Book 10 of the *Institutio*, Erasmus approves of for criticism. Finally, the exercise of turning Greek into Latin, which is recommended in the *Ratio*, is, of course, found in both Cicero and Quintilian. As further proof of a real devotion to Quintilian, we find Erasmus indicating in his letters that he himself intended to bring forth an edition of the *Institutio*.[13]

Next after Erasmus in importance, undoubtedly the leading figure in the scholarly world in England at this time, was the Spaniard, Juan Luis Vives. At the invitation of Cardinal Wolsey, he came to Oxford in the autumn of 1522; in the following year there was offered him a lectureship in Humanity at the University. Later he was appointed tutor to Princess Mary. Foster Watson, who points out that Vives has been referred to as "the second Quintilian," considers the *De Tradendis Disciplinis* (1531), and the *Linguae Latinae Exercitatio* or *School Dialogues* (1539), as his great pedagogical works, "the first a most comprehensive theoretical work in education." "The *Exercitatio* is perhaps the most interesting school text-book of the age."[14]

The modern reader who carefully studies the translations[15] of the works of Vives can see at once the marked similarity between his

[12] W. H. Woodward, *Desiderius Erasmus, Concerning the Aim and Method of Education, Cambridge*, 1904, p. 20.

[13] See Epistles 115, 324, and 335 in *Epistles of Erasmus*, translated by F. M. Nichols, London, 1901, 1.238; 2.205; 2.215.

[14] *Tudor School-Boy Life, The Dialogues of Juan Luis Vives*, translated by Foster Watson, London, 1908, Introduction, p. xvii.

[15] See also *Vives: On Education*, a translation of *De Tradendis Disciplinis*, Cambridge, 1913.

theories and those of Quintilian.[16] The ideas contained in the four books of the *Disciplinis* on the value of group teaching,[17] the merit in a boy's imitation of the good,[18] the importance of right speaking,[19] the method of interpretation of authors,[20] the development of memory,[21] corporal punishment,[22] figures of speech,[23] the value of Homer,[24] and the use of the *Institutio* as a text—[25] all show a reliance upon the early master both in similarity of thought and in actual citation. Continuing, we may include the portions dealing with the use of models in speaking and writing,[26] the gift of the teacher,[27] the *Declamations* of Quintilian,[28] the cultivation of judgment,[29] the value of history,[30] the correction of written composition,[31] progress in learning,[32] the grammarian's standard,[33] the proper conditions for study,[34] and the noble purpose of eloquence;[35] all these portions quote from the precepts of the *Institutio.*

Although Sir Thomas Elyot probably is more indebted to Plato than to any other writer for the main concepts of *The Governour* (1531), yet his book in several places contains quotations or echoes from Quintilian; in particular, in the discussion of the proper age to begin studies,[36] the best type of student,[37] the study of Greek and

[16] S.S. Laurie says: "There is, I suspect, little in Vives that may not be found in Quintilian and Plutarch." *Op. cit.*, p. 144.

[17] Watson, *Vives: On Education*, p. 66; Cf. *Inst. Orat.* 1.2. 17-29.

[18] *Ibid.*, p. 79; Cf. *Inst. Orat.* 1.3.

[19] *Ibid.*, p. 90, note 2 and p. 91, note 1; Cf. *Inst. Orat.* 1.1.

[20] *Ibid.*, p. 106; Cf. *Inst. Orat.* 10. 1.

[21] *Ibid.*, p. 109; Cf. *Inst. Orat.* 1.3.1.

[22] *Ibid.*, p. 120, note 1; Cf. *Inst. Orat.* 1.3.13-17.

[23] *Ibid.*, p. 134; Cf. *Inst. Orat.* 9.3.

[24] *Ibid.*, p. 145, note, 2; Cf. *Inst. Orat.* 10.1.

[25] *Ibid.*, pp. 152, 153, 183.

[26] *Ibid.*, pp. 189, 190; *Cf. Inst. Orat.* 1.2 and 10.2.

[27] *Ibid.*, p. 192; Cf. *Inst. Orat.* 1.2 and 2.2.

[28] *Ibid.*, pp. 141, 193. Vives questions the mediæval custom of assigning authorship of the *Declamations* to Quintilian. He himself published an imitation of them in 1520.

[29] *Ibid.*, p. 230; Cf. *Inst. Orat.* 10.1.

[30] *Ibid.*, p. 235; Cf. *Inst. Orat.* 10. 1.31-34.

[31] *Ibid.*, p. 301; Cf. *Inst. Orat.* 10.4.

[32] *Ibid.*, p. 118; Cf. *Inst. Orat.* 1.1.

[33] *Ibid.*, pp. 152, 154; Cf. *Inst. Orat.* 1.8.21.

[34] *Ibid.*, p. 186; Cf. *Inst. Orat.* 10.3.

[35] *Ibid.*, pp. 186, 292; Cf. *Inst. Orat.* 12.1.

[36] *The Boke named the Governour*, ed. by H.H.S. Croft. London, 1908, 1.31; Cf. *Inst. Orat.* 1.1.15-20.

[37] *Ibid.*, 1.51; Cf. *Inst. Orat.* 1.3.7.

Latin,[38] training in memory,[39] the great merit of Homer,[40] the use of the *Institutio* as a text,[41] the value of Livy,[42] poets and versifiers,[43] gentleness in discipline,[44] and the worth of ancient authors.[45] In his first book, Elyot discusses "for what cause at this day there be in this realme fewe perfecte schole maisters." Thus, after setting up Quintilian's grammarian as his ideal, he concludes in despair: "Then beholde howe fewe grammariens after this description be in this realme."[46]

In *The Scholemaster* (1570), Roger Ascham reveals a somewhat mistaken and prejudiced notion of the *Institutio,* accusing Quintilian in one place of having "a lust to dissent from Tully."[47] But, evidence of respect for Quintilian's ideas is not lacking. Indeed, one might say that a large part of the doctrine of Imitation, for which *The Scholemaster* has so often been praised, is derived from Quintilian.[48] Ascham says that he regards the writings of Johann Sturm on Imitation "farre best of all;" but, of course, the German scholar was himself a borrower from the ancients, and especially from Quintilian.[49] And so, while it is true that Ascham seldom seeks out the Roman teacher for praise,[50] it is patent that much of the humanistic doctrine

[38] *Ibid.,* 1.53-4, 131; Cf. *Inst. Orat.* 1.1.12, 15.
[39] *Ibid.,* 1.57; Cf. *Inst. Orat.* 11.2.1.
[40] *Ibid.,* 1.58 Cf. *Inst. Orat.* 10.1.46.
[41] *Ibid.,* 1.72-3.
[42] *Ibid.,* 1.82; Cf. *Inst. Orat.* 10.1.32.
[43] *Ibid.,* 1.120; Cf. *Inst. Orat.* 10.1.89.
[44] *Ibid.,* 1.32; Cf. *Inst. Orat.* 1.1.20.
[45] *Ibid.,* 1.131 and 2.401; Cf. *Inst. Orat.* 10.1.40.
[46] *Ibid.,* 1. 163-5; Cf. *Inst. Oral.* 1.4.4.
[47] Ascham, *Works,* ed. by J. A. Giles, London, 1864-5, 3.176; see also 3.192 and 3.221.
[48] See *Inst. Orat.* 1.3.1; 10.1.3. Here Quintilian outlines the qualifications for the training of the ideal orator: "For obviously, the power of speech is the first essential, . . . the power of imitation comes next, and third and last, diligent practice in writing." I quote from the translation of H.E. Butler in the Loeb series, London, 1920-22. The doctrine of Imitation is fully considered in 10. 2.
[49] Sturm's principal educational work was *De Litterarum Ludis* (1538). J.E. Spingarn says: "According to Sturm, imitation is not the servile copying of words and phrases; it is 'a vehement and artistic application of mind,' which judiciously uses and transfigures all that it imitates. Sturm's theory of imitation is not entirely original, but comes through Agricola and Melanchthon from Quintilian." *A History of Literary Criticism in the Renaissance,* New York, 1899, p. 132.
[50] "Then must the master come to Quintilian's goodly lesson *de emendatione. Works.* 3.183. "Quintilian in his learned chapter *de compositione, . . . Ibid.,*

of the *Institutio* has found itself again in *The Scholemaster*. Specifically, Ascham's views on discipline, on praise and gentleness in teaching, on the exercise of writing in learning to prepare speeches, on the importance of memory, on the effects of companions on children, and on the use of rhetoric as an organon, may all be traced to our writer of the late first century A.D. Whereas Quintilian would have his youth trained to speak well, Ascham simply changed the emphasis to writing; he insists that the best way to perfection in the mother tongue is to be found in the mastery of the Latin.

Richard Mulcaster, the first headmaster of Merchant Taylors' School, displays a remarkably wide acquaintance with the classics in his two books, *Positions* (1581) and *The Elementarie* (1582). The actual references to the *Institutio* in *Positions* are few, but sufficiently show Mulcaster's respect for Quintilian. For example, in speaking of the value of public schools, Mulcaster says:

> Use common schools to the best, join a tutor to your child, let Quintilian be your guide; all things will be well done where such care is at hand, and that is much better done, which is done before witness to encourage the child. Comparisons inspire virtues, hearing spreads learning; one is none; and if he do something at home, what would he do with company?[51]

In *The Elementarie* we find Quintilian called upon under the subjects of a plan of studies,[52] custom in writing,[53] the grammarian,[54] how young children are to be taught,[55] the value of good examples,[56] and how to inspire a boy.[57]

The Arte of English Poesie, probably written by Richard Puttenham, and published in 1589, was one of the notable works on poetic theory of the century. In his third book, Of Ornament, the author gives us a most elaborate inventory of rhetorical terms. Not content with repeating the Greek and Latin technical names of the figures, he attempts an English translation of them. For instance, *aposiopesis* is called the "Figure of Silence," *ironia* becomes the "Drye Mock," *enigma* is the "Riddle," and *epitheton* is the "Qualifier." And what is the source of this great list of terms? Although the author makes no acknowledgement of his indebtedness, there can be no doubt that he has helped himself from the *Institutio*. In a dozen or more in-

3.250. Altogether there are about twenty references, plain or implied, in *The Scholemaster*.

[51] *Positions*, ed. by R. H. Quick, London, 1888, p. 11.

[52] *The Elementarie*, ed. by E. T. Campagnac, Oxford, 1925, p. 10.

[53] *Ibid.*, pp. 104-06.

[54] *Ibid.*, p. 56, and *Positions*, p. 161.

[55] *Ibid.*, pp. 40-1. [56] *Ibid.*, p. 23. [57] *Ibid.*, p. 17.

stances the illustrations used are direct translations from the very ones used by Quintilian. In all, some one hundred and twenty rhetorical terms are discussed. Ninety-two of these are quickly found in the *Institutio.*[58] Some twenty-eight are not so readily traceable, but I suggest that terms like *auxiexis, pragmatographica, epizeuxis, hypozeuxis, enallage, sillepsis, liptote,* and others come from Henry Peacham's *Garden of Eloquence* (1577).

The Arte of English Poesie also gives us an interesting sidelight on the intellectual diversion of a statesman of the day, Sir Nicholas Bacon (1509–1579), the father of Francis Bacon. From him, we are told, came "more grave and natural eloquence than from all the orators of Oxford or Cambridge."

> I have come to the Lord Keeper, Sir Nicholas Bacon, and found him sitting in his gallery with the works of Quintilian before him; indeed, he was a most eloquent man, and of rare learning and wisdom, as ever I knew England to breed, and one that joyed as much in learned men and men of good wits.[59]

W. L. Rushton in *Shakespeare and "The Arte of English Poesie,"* Liverpool, 1909, p. 1, says: "Shakespeare not only introduces in his plays many of the figures which Puttenham describes, but also frequently uses the same words which appear in the examples Puttenham gives of Figures."

There is proof that the study of Quintilian was not neglected at the English universities during the Renaissance. By the statutes of Edward VI of 1549, a professor of dialectics and rhetoric was appointed at Cambridge. He was to lecture on the *Elenchi* of Aristotle, Cicero's *Topics,* Quintilian, and Hermogenes.[60] At Oxford, legislation for the betterment of learning was enacted somewhat earlier. By the foundation-statutes issued to Bishop Fox for Corpus Christi College in 1517, the lecturer on humanity was to expound, among other prose writers, Cicero, Sallust, Pliny, Livy, and Quintilian.[61] Cardinal College was founded in 1525. By its statutes, issued shortly afterward, and revised in 1527, the Professor of Humanity was to give daily lectures on Cicero, Trapezuntius, and Quintilian.[62]

[58] See the thorough article by LaRue Van Hook: "Greek Rhetorical Terminology in Puttenham's *The Arte of English Poesie,*" in *Transactions of the American Philological Association* 45(1914). 111-28. It would seem that Van Hook is over zealous in stating Puttenham's debt to Quintilian. He finds, p. 116: "only fourteen terms unaccounted for, and it is quite probable that most of these 14 terms could be found, in some form or other, somewhere in Quintilian's great work, which bristles with technical terms."

[59] *The Arte of English Poesie,* London, 1589, p. 107.

[60] Mullinger, *Op. cit.,* 2.109-11.

[61] Maxwell Lyte, *Op. cit.,* 1.412. See also G. R. M. Ward, *The Foundation Statutes of Corpus Christi College,* London, 1847, p. 99 ff.

[62] Maxwell Lyte, *Op. cit.,* 1.453.

The Seventeenth Century

In the seventeenth century, Quintilian's chief supporter is Ben Jonson. His important prose work, *Timber, or Discoveries,* was written at some time between 1620 and 1635, and published in 1641. Maurice Castelain has marked out the leading parallels between Jonson's thoughts and those of his predecessors in an excellent critical edition of *Discoveries.*[63] Of the thirty authors from whom Jonson, according to Castelain, borrows in this work, Quintilian heads the list with no fewer than twenty-seven extracts. Twelve passages or allusions come from Book I of the *Institutio,* five from Book X, and the remainder from Books II, IV, VIII, and XII. In some instances Jonson has merely appropriated the thought of the *Institutio*; in others he has made an almost literal translation; in a few he has actually taken over the Latin phraseology intact.[64] A comparison of these passages from *Timber* with the Latin originals leads the reader to agree with Castelain that Jonson "must have known by heart whole chapters from Quintilian and Seneca, the Rhetorician."[65]

This marvelous capacity of Jonson's mind to utilize classical patterns of thought for his immediate purpose is also evident in the celebrated *Conversations* with William Drummond of Hawthornden. Here, it will be recalled, Jonson advised the reading of the *Institutio,* saying, as Drummond records the remark, that Quintilian "would tell me the faults of my verses as if he had lived with me."[66] There are at least four instances in the *Conversations* of Jonson's applying critical phrases of Quintilian to other authors.[67]

We see the growing importance that attaches to a speaker's study of delivery in Jonson's day in the appearance of John Bulwer's *Chirologia and Chironomia* (1644). The author calls himself a "Philochirosophus," and says that he has investigated the "Canons, Lawes, Rites, Ordinances, and Institutes of Rhetoricians, both Ancient and Moderne, Touching the artificial managing of the Hand in

[63] Paris, 1906. See also: Maurice Castelain, *Ben Jonson, L'Homme* et L'Œuvre, Paris, 1907.

[64] The longer parts which Jonson makes his own from the *Institutio* are to be found in the following sections of *Discoveries:* 62, De vere argutis; 63, Censura de poetis; 65, Ingeniorum discrimina; 110, De pictura; 114, On Studies for Children; 115, De stylo et optimo scribendi genere; 116, Praecipiendi modi; 117, Fals. querel. fugienda; and 118 Praecept. element.

[65] Ben Jonson, *Discoveries,* ed. by Castelain, Introduction, p. xxv.

[66] *Conversations,* ed. by R. F. Patterson, London, 1923, p. 2.

[67] *Ibid.,* Introduction, p. xxv. See also p. 13.

Speaking."[68] Throughout Bulwer's treatise, the *Institutio*, and especially Book XI, is cited again and again. It is true, Cicero's utterances are not overlooked. But Bulwer calls Quintilian "the most cleare Interpretour of all the ancients;[69] and the *Chironomia* is indeed very largely a recast of the Roman professor's observations on *actio*.

Obadiah Walker is likewise a writer of text-books that show respect for Quintilian. Walker's two books are: *Some Instructions Concerning the Art of Oratory, collected for the use of a Friend, a young Student* (1659); and *Of Education, especially of a young Gentleman* (1673).[70] In the former work, Cicero and more frequently Quintilian seem to be the only authorities relied upon. Walker extracts sentences and ideas from the *Institutio* in practically every one of his sections, all told, in about twenty instances. It frequently appears that the phrases of Quintilian are so well-known to Walker that he sees no need of citing the places where they may be found.

The diplomat and poet, Sir Henry Wotton, who late in life became provost of Eton, was the author of a curious little essay of twenty pages called *A Philosophicall Survey of Education, or Moral Architecture*, posthumously published in 1651. Wotton displays a fondness for Quintilian in several complimentary passages, and in the parenthetical remark, "whom I have ever thought, since any use of my poor judgment, both the elegantest and soundest of all Roman pens."[71]

At some time in the early part of the seventeenth century, the study of rhetoric as an academic discipline began to suffer a reaction. The concept of "exorning the matter" caused many people to regard rhetoric as an affected and artificial instrument for misleading men by a deceitful method. Towards the end of the century, the philosopher, John Locke, clearly showed his distrust of rhetoric. He said in his *Thoughts Concerning Education* (1693) that he had "seldom or never observed any one to get the skill of reasoning well, or speaking handsomely, by studying these rules which pretend to teach it."[72]

[68] Title-page of *Chironomia*.

[69] *Ibid.*, p. 125.

[70] In Chapter XI of this work, entitled "Invention, Memory, and Judgment," Walker prescribes as "inventive" authors: Cicero, Quintilian, and Seneca.

[71] Essay found in Wotton's *Reliquae Wottoniae*, London, 1651, pp. 315-35. References to Quintilian are on pp. 330-31.

[72] *The Works of John Locke, Esq.*, London, 1740, 3.85.

In his *Essay on Human Understanding* (1690) Locke wrote that rhetoric and eloquence "are for nothing else but to insinuate wrong ideas, move the passions, and thereby mislead the judgement, an so, indeed, are perfect cheat."[73]

Despite his strictures on the study of rhetoric, however, there is a strikingly sympathetic relationship between Locke's two essays and Quintilian's *Institutio*. Laurie, who believes that both essays should be read together, considers the *Thoughts* "the best treatise on education which has ever appeared with the (doubtful) exception of Quintilian."[74] A reader who has the main doctrine of the *Institutio* in mind is at once impressed with the humane reasonableness of Locke's theories. Nor can we escape the general similarity of the *Thoughts* and the *Institutio* on the subject of the early training of children. Locke is opposed to corporal punishment; sees the importance of the influence of companions; believes that lessons should not be tasks; and thinks that a few sensible rules bring better results than an unnecessary many.[75] In neither of these two works, apparently, does Locke name Quintilian. In fact, as for Locke's sources, Laurie holds that: "Notwithstanding his debt to Rabelais and still more to Montaigne, his educational conceptions are in the truest sense his own."[76] As I have intimated, however, either knowingly or otherwise, "the English Rationalist" has several ideas that, historically viewed, have proceeded from Quintilian.[77]

The Eighteenth Century

From about the year 1750 to some time in the early nineteenth century there was a tremendous interest in England in the art of speaking—in lectures by professors of the subject, in their books, and in parliamentary speeches themselves. John Ward, who in 1720 had been appointed Professor of Rhetoric at Gresham College, taught there continuously until his death in 1758. John Lawson was

[73] *Ibid.*, 1.245.

[74] Laurie, *Op. cit.*, p. vi.

[75] These may be found *passim* in R.H. Quick's second edition of *Some Thoughts Concerning Education*, Cambridge, 1889, and also in the three chapters on Locke in Laurie, *Op. cit.*, pp. 181-234.

[76] Laurie, *Op. cit.*, p. 234.

[77] Gabriel Compayré points out that the scheme recommended by Locke in the *Thoughts*, section 160, of teaching children to write with the aid of a stencil, is the same as the one suggested by Quintilian. *The History of Pedagogy*, translated by W. H. Payne, Boston, 1892, p. 49. See Quick's edition of the *Thoughts*, p. 36.

made lecturer in oratory and history at Trinity College, Dublin, in 1753. His *Lectures Concerning Oratory* were first published in 1758, and quickly gave him a considerable reputation. While Aristotle is clearly Lawson's master, throughout his book we find much to indicate a debt to Quintilian. In Lawson's fourth lecture, Quintilian and Longinus are treated in full and in terms of high praise. Ward's two-volume work, *A System of Oratory*, published in 1759, undoubtedly represents the best synthesis of ancient rhetorical theory to be found in English. The first chapter mentions the contributions of Aristotle, Hermogenes, and Cicero. Then Ward reveals his favorite:

> But Quintilian himself outdid all who went before him, in diligence and accuracy as a writer. . . . [His] *Institutions* are so comprehensive, and written with that great exactness and judgment, that they are generally allowed to be the most perfect work of this kind.[78]

A study of the lectures plainly shows that nearly forty years of teaching have made Ward a master of Cicero and Quintilian. He quotes or refers to one or the other on almost every other page of the two volumes, in all, some two hundred and thirty times. The citations to the *Institutio* are in a slight majority.

A more detailed treatise is the two-volume work by the Scottish clergyman, John Ogilvie, called *Philosophical and Critical Observations on the Nature, Character, and Various Species of Composition* (1774). The acknowledgement of the author to the mastery of Quintilian is found in the first book, under the section, "Introductory Observations on the Nature of Composition":

> Of Roman writers who have treated of the present subject, the judicious and elegant Quintilian is by far the most copious and particular. In his well-known work, entitled *Instutiones Oratoriae* (of which the reader will find much use in the following essay, and whose excellence is equal to almost any eulogium), the present subject is discussed by itself.[79]

Perhaps the most popular text of this great age of classicism was that of the professor of *belles-lettres* at Edinburgh University, Hugh Blair. His *Lectures on Rhetoric and Belles-Lettres* were first issued in 1783. They reached a tenth edition in 1806, and have since been many times reprinted. In his chapter entitled "Means of Improving in Eloquence," Blair contends:

> But of all the ancient writers on the subject of oratory, the most instructive, and most useful, is Quintilian. I know few books which abound more with

[78] John Ward, *A System of Oratory*, London, 1759, 1.15.
[79] John Ogilvie, *Observations*, London, 1774, 1.8.

good sense, and discover a greater degree of just and accurate taste, than Quintilian's *Institutions*. Almost all the principles of good criticism are to be found in them. He has digested into excellent order all the ancient ideas concerning rhetoric; and is, at the same time, himself an eloquent writer. Though some parts of his work contain too much of the technical and artificial system then in vogue, and for that reason may be dry and tedious, yet I would not advise the omitting to read any part of his *Institutions*. To pleaders at the bar, even these technical parts may prove of much use. Seldom has any person of more sound and distinct judgment that Quintilian applied himself to the study of the art of oratory.[80]

Cicero, and more frequently Quintilian, are Blair's principal authorities. He selects ideas from the *Institutio* with such care and effect that Colson is obliged to say: "His quotations would make a very respectable 'florigelium' to illustrate Quintilian's sense and incisiveness."[81] In all, there are about forty citations, including allusions to the Roman teacher's words on the study of grammar,[82] perspicuity of style, [83] the structure of sentences,[84] metaphors,[85] similes,[86] instructions for good writing,[87] Cicero's oratory,[88] and the proper division in an oration.[89] Much as some may condemn or belittle Blair's originality or judgment as shown in the *Lectures,* we should recall that the tremendous vogue of his teaching and the use of his book until the middle of the next century were potent forces in keeping alive the beauty and soundness of Quintilian's opinions.

The writer who, possibly more than any other, has made Quintilian's name familiar in English literature of the Augustan Age is, of course, Pope. His *Essay on Criticism,* published in 1711, when he was but twenty-two years old, attracted endless attention. The lines which praise the *Institutio* read:

> In grave Quintilian's copious work, we find
> The justest rules and clearest method joined:
> Thus useful arms in magazines we place,
> All ranged in order, and disposed with grace,
> But less to please the eye than arm the hand,
> Still fit for use, and ready at command.[90]

[80] Hugh Blair, *Lectures on Rhetoric,* Philadelphia, 1846, pp. 386-87.

[81] F. H. Colson, *Quintilian, Book I,* Cambridge, 1924, Introduction, p. lxxxvii, note 3.

[82] Blair, *Op. cit.,* p. 94.

[83] *Ibid.,* pp. 102, 107.

[84] *Ibid.,* p. 131.

[85] *Ibid.,* p. 164.

[86] *Ibid.,* p. 186.

[87] *Ibid.,* pp. 213-14.

[88] *Ibid.,* pp. 275-76.

[89] *Ibid.,* pp. 348-49.

[90] Lines 669-74 of the *Essay* in *The Works of Alexander Pope,* ed. by Elwin-Courthope, London, 1871, 2.76.

Aside from the fact that Pope took pains to indicate his debt to Quintilian in his own published notes on the *Essay,* we know from his conversations with the Rev. Joseph Spence that he regarded Quintilian "as an old favourite author."[91]

When, some years later, Joseph Warton published his *Essay on the Genius and Writings of Pope* (1756-82), he took occasion to express his own estimate of the *Institutio* by saying:

> To commend Quintilian barely for his method, and to insist merely on this excellence, is below the merit of one of the most rational and elegant of Roman writers. Considering the nature of Quintilian's subject, he affords copious matter for a more appropriated and poetical character. No author ever adorned a scientifical treatise with so many beautiful metaphors.[92]

Elsewhere in the *Essay,* Warton distributes his praise with such phrases as "perhaps the most judicious and elegant critic among the ancients;" "whose knowledge of human nature was consummate;" "the admirable tenth chapter of the twelfth book of Quintilian;" and "who speaks of the ancient painters and statuaries with so much taste and sentiment."[93]

The publication of Pope's *Essay* started a series of bitter quarrels. Addison praised the work in the *Spectator;* John Dennis denounced it in a "critical and satyrical" essay; and Lady Mary Wortley Montagu said she at first admired it very much until she read the ancient critics and found "that it was all stolen." As a result of this controversy, the eighteenth-century literary man must have been virtually forced to read or re-read Quintilian.

There are several instances of Samuel Johnson's liking for the *Institutio* in the *Lives of the Poets*[94] and in the *Rambler.*[95] In the

[91] Spence, *Anecdotes, Observations, and Characters of Books and Men,* London, 1820, p. 234. Pope applied Quintilian's theory of Imitation in his own early training in composition. His practice he revealed to Spence, as follows: "In these rambles of mine through the poets; when I met with a passage, or story, that pleased me more than ordinary, I used to endeavour to imitate it, or translate it into English; and this gave rise to my Imitations published so long after." Then Spence adds the note: "He named, among other books he then read, the criticisms of Rapin and Bossu; and these might be what lead him to write his *Essay on Criticism.* He used to mention Quintilian too as an old favourite author with him."

[92] Warton, *An Essay on the Genius and Writings of Pope,* 3rd ed., London, 1772, 1.78. See the doctoral study, *Quintilian's Didactic Metaphors,* by Jane Gray Carter, New York, 1910.

[93] Warton, *Op. cit.,* 2.230; 1.83; 2.461; 1.114.

[94] Johnson, *Lives of the English Poets,* ed. by G. B. Hill, Oxford, 1905, 3.340, note 8; 2.77; 1.416.

[95] No. 88 for Jan. 19, 1751. *The Works of Samuel Johnson,* LL.D., ed. by Arthur Murphy, Dublin, 1793, 3.66.

first edition of Robert Dodsley's *Preceptor* (1748), Johnson outlined a rather strenuous program of training for children, and when he arrives at the advanced stage of the study of rhetoric, he advises thus: "For a farther progress in these studies, they may consult Quintilian and Vossius's Rhetoric."[96] P. H. Houston has recently pointed out that, although the actual references to the *Institutio* by Johnson are few in number, yet they are sufficient to prove it had been the object of his careful study. Houston also reminds us that Quintilian and Johnson performed similar services in criticism for their respective ages, and concludes that "Quintilian's writings must have become a part of Johnson's intellectual being."[97]

The popular interest in literary criticism in the middle of the eighteenth century is illustrated by the offer of the Edinburgh Society for the Encouragement of Arts of a gold medal for the best essay on the subject of taste. In 1756 the award was made to Alexander Gerard, professor of moral philosophy at Mareschal College, Aberdeen. In his *Essay on Taste,* published in 1759, Gerard gives this opinion:

> Longinus, Dionysius of Halicarnaceus, and Aristotle, all possessed fine taste. But it will scarce be denied that the first peculiarly excelled in *sensibility,* the second in *refinement,* and the last in *correctness* and *enlargement.* There is none of the ancients in whom all the four appear to have been equally, or in a higher degree, combined than in Quintilian.[98]

Altogether there are some half-dozen useful adaptations from the *Institutio* in Gerard's essay.[99]

There remain three other important witnesses of the eighteenth century whose testimony is worth quoting. While serving as a captain in the South Hampshire militia at Ringwood, Edward Gibbon wrote in his journal for June 6, 1762:

> I formed a design (but I doubt whether I shall find time to execute it) to give part of my day to Homer, and part to Quintilian; that is, to unite the example with the precept. Accordingly, I began with Quintilian, in Burman's edition; read his article in Bayle's *Dictionary,* the preface of Burman. Burman was a mere critic, without being (in my opinion) a good one, since a good critic must reason well; and Burman never could reason at all. I began likewise the *Annales Quintilianaei* of Dodwell, and read C. 1-3.[100]

[96] Dodsley, *The Preceptor,* London, 1763 ed., p. xxiii.

[97] Houston, *Doctor Johnson, A Study in Eighteenth-Century Humanism,* Cambridge, 1923, pp. 51-2.

[98] Gerard, *An Essay on Taste,* London, 1759, p. 157.

[99] See especially *ibid.,* p. 180.

[100] *Miscellaneous Works of Edward Gibbon, Esq.,* ed. by John, Lord Sheffield, Dublin, 1796, 2.298. Also in *Gibbon's Journal,* ed. by D. M. Low, London, 1929, p. 81. For other references see *Misc. Works,* 2.417, and the *Decline and Fall of the Roman Empire,* ed. by J. B. Bury, London, 1898-1900, 5.455, note.

Lord Chesterfield, whom Boswell called the best speaker in the House of Lords, paid his respects to Quintilian several times in his writings. In a letter to his son from London, dated June 21, 1748, Chesterfield is much exercised over a report of bad enunciation and admonishes:

> Good God! If this ungraceful and disagreeable manner of speaking had, either by your negligence or mine, become more habitual to you, as in a couple of years more it would have been, what a figure you would have made in company or in a public assembly! Who would have liked you in the one, or attended to you in the other? Read what Cicero and Quintilian say of enunciation, and see what stress they lay upon the gracefulness of it.[101]

The advice must have been followed, for on November 24, 1749, we find Chesterfield again writing:

> You have read Quintilian, the best book in the world to form an orator; pray read Cicero *De Oratore,* the best book in the world to finish one. Translate and re-translate, from and to Latin, Greek, and English. Make yourself a pure and elegant English style; it requires nothing but application.[102]

The last book I shall quote from for the eighteenth century is not well known. It is called *Personal Nobility: or, Letters to a Young Nobleman on the Conduct of his Studies, and the Dignity of the Peerage.* This was published in 1793 by the Rev. Vicesmius Knox, and was dedicated to Charles James Fox. It is characterized by a respectful admiration for the classics, and reads as from a man of unusual good judgment. Cicero is the author's approved model for the English nobleman, and the assiduous imitation of his speeches is the way to perfection. But, for the study of rhetorical theory, Knox unreservedly prescribes the *Institutio,* saying:

> But I recommend Quintilian; he is indeed a most excellent writer, and worthy of your study for his goodness of heart and his general good sense, independently of his instruction as a master of rhetoric.
>
> As a master of rhetoric, he is the best qualified of any I know to introduce you to a knowledge of the excellencies of Cicero and Demosthenes. . . .
>
> If I should tell you how greatly I admire Quintilian, you would attribute my praises to the prejudice of an unreasonable partiality. I have long made him my companion; and I know no author in didactics that equals the merit of Quintilian. If you anxiously desire improvement, read Quintilian repeatedly.[103]

[101] *The Letters of Philip Dormer Stanhope,* ed. by John Bradshaw, New York, 1892, 1.118.

[102] Chesterfield's *Letter, Op. cit.,* 1.278. The same advice is given again in *Letters of Philip Dormer, Fourth Earl of Chesterfield, to his Godson and Successor,* ed. by the Earl of Carnarvon, Oxford, 1890, p. 325.

[103] Knox, *Personal Nobility,* London, 1793, pp. 68-70. See also pp. 65-6.

The Nineteenth Century

Noteworthy books on public speaking and composition in the nineteenth century are relatively few. An interest in eloquence was a logical and proper outgrowth of the age of classicism of the preceding century. But with the passing of that age, and indeed, almost with the death in 1797 of Burke, its last great representative, we find a decreasing number of works on rhetoric and eloquence. It is true that popular treatises like the lectures of Ward, Lawson, and Blair continued to be published and used well into the eighteen hundreds. But, for the most part, the new productions are neither numerous nor significant.

Included in that amazing list of books which Lord Byron says he read before he was fifteen is the Reverend Gilbert Austin's *Chironomia, or a Treatise on Rhetorical Delivery* (1806). Exhibiting a detailed knowledge of Cicero and Quintilian, Austin refers to the *Institutio* over a hundred times. In Chapter IV, "Of Gesture," there is an evaluation of the two ancient authorities as follows:

> Cicero has said something upon it [Delivery], valuable indeed, as everything must be from him, but extremely short. To Quintilian we are indebted for the most extensive, and the best, treatise which antiquity has left us; he has devoted nearly a whole book of his *Institutes* to the subject of delivery, and has given many excellent precepts.[104]

After explaining the wide range of subjects which the study of oratory comprised in the days of Domitian, Austin comments:

> The education of the British youth seems to have been modeled upon the very plan of Quintilian. All the learning of the ancients is their study; they read their historians, their poets, their orators, their philosophers; they comment upon them, they commit them to memory, they write expressly in imitation of their most beautiful passages.[105]

As proof that Quintilian was studied in the universities, we find Bishop Copleston, in his famous *Reply to the Calumnies of the Edinburgh Review,* explaining the content of the examination in Rhetoric and Ethics at Oxford in 1810:

> Besides these treatises of Aristotle, Quintilian as belonging to Rhetoric, and the philosophical works of Cicero, especially the *De Officiis* as belonging to Ethics, are admitted.[106]

[104] Austin, *Chironomia,* London, 1806, p. 147.

[105] *Ibid.,* p. 17.

[106] Edward Copleston, *A Reply to the Calumnies of the Edinburgh Review,* 2nd ed., Oxford, 1810, pp. 128-9.

I suppose the most unwitting admirer of Quintilian's doctrine in recent times was the poet, Algernon Swinburne. He devoted almost a third of his book, *A Study of Ben Jonson,* to critical praise of *Discoveries*—of which a part of section 114, on the training of children, receives special commendation. Swinburne says of this:

> If the nineteenth century has anything on this subect as well worth hearing—as wise, as humane, as reasonable, as full of sympathy and of judgment—as these reflections and animadversions of a scholar living in the first half or quarter of the seventeenth, I have never chanced to meet with it.[107]

Although he mentioned Quintilian on the preceding page, clearly Swinburne was unaware that much of the thought of his favorite excerpt is to be found in the *Institutio,* 1.3.7, and 1.3.13.[108] Now was he conscious of the cento-like character of *Discoveries* with its very pronounced indebtedness to Quintilian? Otherwise the encomium: "A single leaf of his *Discoveries* is worth all his lyrics, tragedies, and epigrams together."[109] might not have been written.

Perhaps the most distinguished English prose-writer to admire the *Institutio* was Thomas De Quincey. In his essay, *Rhetoric,* published in *Blackwood's Magazine* for December, 1828, De Quincey held that rhetorical method was best taught by the Greeks, but adds:

> In reality, for a triumph over the difficulties of the subject, and as a lesson on the possibility of imparting grace to the treatment of scholastic topics naturally as intractable as Grammar or Prosody, there is no such *chef-d'œuvre* to this hour in any literature as the *Institutions* of Quintilian. Laying this one case out of the comparison however, the Greek superiority was indisputable.[110]

Both Lord Macaulay[111] and Lord Beaconsfield[112] were fond of Quintilian. And so was John Stuart Mill. In his *Autobiography,* Mill relates his studies at the age of twelve:

> At this time I also read the whole of Tacitus, Juvenal, and Quintilian. The latter, owing to his obscure style and to scholastic details, of which many parts of his treatise are made up, is little read and seldom sufficiently appreciated. His book is a kind of encyclopædia of the thoughts of the ancients on the whole field of education and culture; and I have retained through life many valuable

[107] Swinburne, *A Study of Ben Jonson,* London, 1889, pp. 167-8.

[108] Ben Jonson, *Discoveries,* ed. by Castelain, pp. 83-4.

[109] Swinburne, *Op. cit.,* p. 124.

[110] Thomas De Quincey, *Essays on Style, Rhetoric, and Language,* ed. by F. N. Scott, Boston, 1893, p. 148.

[111] See the *Life and Letters of Lord Macaulay,* ed. by G. O. Trevelyan, Detroit, 1877, 1.296.

[112] See the *Life, Letters, and Diaries of Sir Stafford Northcote,* ed. by Andrew Lang, Edinburgh, 1890, 2.178.

ideas which I can distinctly trace to my reading of him, even at that early age.[113]

Recent Years

Among the university scholars of recent years who have highly praised the critical opinions of Quintilian, are, to name only three, Professors George Saintsbury,[114] S. S. Laurie,[115] and John Churton Collins. When Sir Edmund Gosse published his badly conceived and inaccurate book, *From Shakespeare to Pope,* in 1885, Collins attracted attention with his brilliant review, *English Literature at the Universities.*[116] Here he vigorously defended the study of classical rhetoric by saying:

> How can a teacher deal adequately even with the subject which these regulations profess to include—the history of criticism—who need have no acquaintance with the *Poetics* and the *Rhetoric,* the *Treatise on the Sublime,* and the *Institutes of Oratory?*[117]

A few years later, Collins even more forcibly deplored the state of affairs at Oxford and Cambridge:

> We have absolutely no provision for systematic critical training. Rhetorical criticism as a subject of teaching is confined to what is known in elementary schools as 'analysis.' Aesthetic and philosophical criticism is a branch of teaching without recognition at all. It has been killed by philology. Fifty years ago such works as the *Institutes of Oratory,* the *De Sublimatate,* and the *Rhetoric* were studied as thoroughly and methodically as the *Ethics* and *Republic* are now. And till that study is revived and extended—till, in addition to the treatises of the ancients, such treatises as the *Laocoon,* and Schiller's *Letters and Essays on Aesthetic Education* have a place in our Universities—there is small hope of sound principles in exegesis.[118]

In the same volume the writer cites the tenth book of the *Institutio,* along with four other works, as the "foundation of a sound critical education."[119] In the judgment of Professor Collins "the only door to the teaching of Milton lies through Quintilian and Longinus."[120]

[113] *Autobiography of John Stuart Mill,* Preface by J. J. Coss, New York, 1924, p. 15.

[114] Saintsbury, *History of Criticism,* London, 1900-04, 1.319.

[115] Laurie, *Pre-Christian Education,* London, 1895, pp. 377-412. See also his *History of Educational Opinion from the Renaissance.*

[116] In *The Quarterly Review,* 163 (1886). pp. 289-329.

[117] Reprinted in Collins, *Ephemera Critica,* London, 1901, p. 67.

[118] Collins, *The Study of Literature,* London, 1891, pp. 39-40.

[119] *Ibid.,* p. 42.

[120] *Ibid.* For other references to Quintilian see *Ibid.,* pp. 78, 82, 84. See also *Ephemera Critica,* p. 278; L. C. Collins, *Life and Memoirs of John Churton Collins,* London, 1912, pp. 109, 178-80; *The Posthumous Essays of John Churton Collins,* London, 1912, p. 259; J. C. Collins, *Studies in Poetry and Criticism,* London, 1905, pp. 214, 235, 249, 287, note.

Conclusion

The *Institutio Oratoria* of Quintilian was known in England long before Poggio's discovery of the manuscript in 1416. The work attained high favor and great reputation in the Renaissance, and again in the eighteenth-century age of classicism. At intervals, and sometimes for long periods, the *Institutio* has remained in the background. But, as our study shows, for well over five hundred years students and scholars have been able to approach and to apply the great Roman teacher's precepts on public speaking, literary criticism, educational theory, and the philosophy of a cultivated gentleman. That the educated Englishman has amply profited from the study of Quintilian and of the other great masters, Aristotle, Plato, and Cicero of course, is attested and reflected in his literature, his educational system, and his culture generally. We of this generation, immersed as we are in a confusion of purposes, misled by the fallacious judgments of our educational specialists, and lost in our efforts to seek a correct method, should find as Erasmus, Vives, Elyot, Ben Jonson, Pope, Samuel Johnson, De Quincey, and Blair found, a stimulating, clarifying, and substantial help in the advice of the first public professor of Rhetoric of Rome.

NATHANIEL CARPENTER'S PLACE IN THE CONTROVERSY BETWEEN DIALECTIC AND RHETORIC

WILBUR SAMUEL HOWELL
Dartmouth College

I

In 1622 Nathaniel Carpenter published at Oxford a volume of philosophical essays. This book is called the *Philosophia Libera* and is an enlarged edition of a work that had first been published pseudonymously at Frankfurt in 1621. Carpenter's main concern in these essays is to examine and refute opinions that were accepted on the authority of Aristotle.[1] Carpenter was neither the first nor the most noted figure in the protest against mediaeval dogmatism, but he has an undoubted place in the movement, and his *Philosophia*

[1] C. de Rémusat, *Histoire de la Philosophie en Angleterre* (Paris, 1875), 1.161-4. See also J. Brucker, *Historia Critica Philosophiae* (Leipsic, 1766-7), V. 614; and J. Prince, *The Worthies of Devon* (London, 1810), 174.

Libera may be listed among the documents of the antischolastic revolution. A detailed history of English philosophy, a full account of the transition from the mediaeval to the modern age, or a systematic treatise on the interpretation and influence of Aristotle's writings would include within its scope the *Philosophia Libera* and accord to Nathaniel Carpenter a modest degree of consideration.

The historian of rhetoric can likewise claim an interest in this book. One essay deals with the relation of dialectic and rhetoric. Carpenter's view is of considerable interest, both for its own sake and for other reasons. This paper presents a translation of his essay, the original of which is in Latin. A brief review of his life and a comment on his interest in rhetoric precede the translation, and the concluding part of this study discusses his argument in the light of other significant views on the same subject.

II

On his deathbed Carpenter regretted that "he had formerly so much courted the maid instead of the mistress." An early biographer immediately corrects whatever impression of frivolity these words convey. "The maid" stands for philosophy and mathematics, we are told in polite haste, and "the mistress" for divinity.[2] But why a life so blameless as Carpenter's should need this apologia is a secret irretrievably locked in the biographer's heart.

In the early seventeenth century, Carpenter was something of a figure among the scholars and divines of Oxford.[3] As has been said, he wrote on philosophical subjects, and the *Philosophia Libera* went through four editions in the course of the century. He was also a poet, a geographer, and a pulpit orator.

His accomplishments in poetry and geography need not concern us here. His sermons, however, are relevant to the present inquiry and should receive brief mention. He delivered them before university audiences at Oxford during the later years of his residence at Exeter College. Frequently reprinted and widely read in an age that knew Donne and Taylor, these were the most successful and most justly celebrated of his works.

[2] A. à Wood, *Athenae Oxonienses* (ed. by P. Bliss, London, 1813-20), II.422. For other biographical notices of Carpenter, see W. P. Courtney, "Carpenter, Nathanael," *Dictionary of National Biography;* Prince, *Worthies,* 173-5; and T. Fuller, *The History of the Worthies of England* (ed. by P. A. Nuttall, London, 1840), I.424.

[3] Carpenter was born at Northleigh, Devon, in 1589, and died at Dublin in 1628.

His most famous sermon, *Achitophel,* attests his interest in rhetoric. When showing how Absolom was admirably fitted to be the instrument of Achitophel's ambition and revenge, Carpenter speaks of the persuasive value of the orator's personality. Absolom was fairest of all the children of Israel. "The seemely symmetry and proportion of all his parts were as so many silent Orators to bespeake applause, and perswade affection."[4] "So much is the bewitching power of a beauteous personage to inchant the wisest judgement, that perswasion is oftner found in the Orator than the Argument, as though his lookes went as herbingers before his language, to prepare a roome, and entertaine attention."

The substance and arrangement of *Achitophel* suggest that Carpenter used a systematic method of amplification as an aid to composition.[6] The episode in which Absolom and Achitophel figure is consciously magnified, the action of the biblical narrative is retarded, the attributes and motives of the characters are inserted and the whole incident adorned with appropriate observations on human life and manners. This is not the place for extended comment on the relation of this sermon to theories of preaching. We need only say that Carpenter's facility in this kind of composition and the astuteness of his comments on rhetoric establish his right to speak on rhetorical problems. What he says of the relation of dialectic and rhetoric will at least not be the judgment of the outright amateur.

III

Unlike many arguments in the *Philosophia Libera,* the essay on dialectic and rhetoric does not directly aim to confute Aristotle. Indeed, there is no evidence in the essay to show that Carpenter was influenced by the famous first sentence of the *Rhetoric.* In effect, however, Carpenter defends a position that is decidedly non-Aristotelian. Zeno, founder of Stoicism, likened dialectic to the closed fist, and rhetoric to the open hand.[7] This way of looking at the two

[4] N. C[arpenter], *Achitophel, or, The Picture of a Wicked Politician* ([London], 1629), 5.

[5] *Achitophel,* 6.

[6] Amplification occupied an important place in early theories of preaching. See H. Caplan, "A Late Medieval Tractate on Preaching," *Studies in Rhetoric and Public Speaking in Honor of J. A. Winans* (1925), 61-90; and, by the same author, "Rhetorical Invention in some Mediaeval Tractates on Preaching," *Speculum,* II (1927), 284-95, and "The Four Senses of Scriptural Interpretation and the Mediaeval Theory of Preaching," *Speculum,* IV (1929), 282-90.

[7] Attributed to Zeno by Cicero (*De Finibus,* 2.6.17, and *Orator,* 32.113),

arts provokes Carpenter's rebuttal. Let us allow him to speak for himself:

Ignorance of the arts advanced so far among the less scientific philosophers that they restricted dialectic to the sterile difficulties of syllogisms, and made rhetoric alone the art that surveys the stylistic expansion of a speech. Accordingly, by means of a certain popular simile, they compared the science of dialectic to the closed fist, and rhetoric to the open hand. But upon how inadequate a basis they rested this opinion of theirs, I shall presently demonstrate.

First, if dialectic be rightly compared to the closed fist and rhetoric to the open hand, it follows that the dialectician is supposed to set forth a thing in a compact manner, and the speaker in a diffuse manner. But such is not true, and therefore the comparison is not apt. The major premise that logically ensues is obviously derived from the very beliefs of those who insist upon this comparison, and the minor can easily be supplied.

All expansion and effusion in a speech are the result of the amplification that the orator uses in speaking.

But amplification is the work of dialectic.

The major premise is beyond controversy. To expand a speech, to dilate its parts, is nothing but amplification (as the term "amplification" itself denotes). The minor premise, however, is also true. For amplification of whatever kind is based upon logical arguments and is a product of the field of dialectic, not rhetoric. For indeed logical arguments are classified by the more cultivated of men into (1) arguments employed in proof, (2) arguments employed in exposition and instruction, and (3) arguments employed in outright amplification (which classification is taken from existing usage). Some arguments are felt to serve the end of demonstration, others the end of exposition, and still others the end of amplification.

Moreover, since three things are required for the fulness of a speech, namely, invention of subject matter, arrangement of arguments, and adornment, it is obvious that the first is supplied from the various fields of knowledge conformably to the speaker's end and purpose, the second from dialectic, and the third from rhetoric. Accordingly, it follows that the various fields of knowledge contribute substance or content, dialectic the tying together and arranging of arguments, and rhetoric merely the flower and spice of the speech. But no sane person denies that the faculty of amplifying is based upon the faculty of arranging arguments.

But if it is said that amplification depends not only upon logical arguments but also upon tropes and figures, and that tropes and figures are the special property of rhetoric, let us reply, first, that the so-called tropes and figures of rhetoric cannot reach beyond the very basis upon which they rest, and that basis is logical arguments. Therefore, expansion and amplification of whatever

by Quintilian (*Institutio Oratoria*, 2.20.7), and by Sextus Empiricus (*Adversus Mathematicos*, 2.7). See A. C. Pearson, *The Fragments of Zeno and Cleanthes* (London, 1891), pp. 83-4.

[8] The title of the essay is: *Logica pugno, Rhetorica palmae, non rectè à Zenone comparatur.* The Latin text on which this translation is based is found in N. Carpenter, *Philosophia Libera* (Oxford, 1622), 158-61.

kind in a speech should be attributed to dialectic rather than to rhetoric, since we ought to assign a thing to its very cause and basis, rather than to externals arising on that basis.

Secondly, we can prove by many instances that tropes and figures do not always expand a statement, but in fact shorten it. Hence, this supposed difference between figurative and scientific language is not in the nature of things, but is rather an accident. The following purely logical proposition of comparison may be used as an example: *Just as the soul disposes itself toward the body, so does the king dispose himself toward the state.* The orator would render this proposition by shortening it into a trope: *The king is the soul of the state.* When the foregoing comparison is expressed as a metaphor, who does not see that the expression has been shortened in the direction of a single phrase or word, who does not recognize in this contraction a brevity purely rhetorical?

Lastly, who does not see the same quality in aposiopesis and in other figures? For in them, likewise, orators contract into stricter limits of expression the propositions that the dialectician, *qua* dialectician, employs more fully and in greater detail.

Therefore, the conclusion is undeniably established, that Zeno's comparison should not be tolerated.[9]

To Carpenter and his contemporaries, "logic" and "dialectic" were synonymous terms, used interchangeably in Latin and English to mean "the art of discovering and arranging arguments," "the art of argumentation," "the art of disputation," and the like. Thomas Wilson, for example, gives these words an identical meaning. In *The Rule of Reason* (1553), p. opposite fol. 3, he says: "Logique, otherwise called Dialect (for thei are bothe one)." Earlier in the same book (fol. 2) he divides "logic" into two parts, Judgment and Invention. In the *Advancement of Learning* (1605), Bacon compares the arts of "logic" and "rhetoric." See below, pp. 24-8. When this book was translated into Latin under the title *De Dignitate et Augmentis Scientiarum* (1623), the word "logic" became "dialectica." See *De Augmentis Scientiarum*, 6.3. Other examples of the similarity of these two words during this period can be found under "dialectic" in *A New English Dictionary*.

Today, "logic" and "dialectic" are no longer synonymous. Our word "dialectic" preserves most of its former meaning and can still be used to signify "the art of finding arguments" or "the art of discussion." For a modern statement of the meaning of this term, see E. L. Hunt, "Dialectic—A Neglected Method of Argument," *Q.J.S.E.*, VII (1921), 221-32. "Logic," however, has changed its meaning. Once an art of inventing and judging proof, it now does not claim to be an art, but is the science of judgment. J. S. Mill says: "Logic neither observes, nor invents, nor discovers; but judges." See *A System of Logic* (3rd edition, London, 1851), I.9. Jevons states that a useful art may be founded on logic, but he argues that logic is really a science, and "a science teaches us to know and an art to do." See W. S. Jevons, *Elementary Lessons in Logic* (4th edition, London, 1874), 7. Logic is, says J. E. Creighton, "the science which

[9] In this translation the Latin word *logica* has been rendered throughout as equivalent to the English word "dialectic". The modern word "logic" would hardly serve to interpret Carpenter's meaning.

investigates the process of thinking," and he goes on to show the difference between this science and the art of argumentation. See *An Introductory Logic* (1898), 1, 8-13.

IV

This essay acquaints us with two distinctions between dialectic and rhetoric. Zeno's distinction rests upon the difference between the open and the compressed style. Rejecting this view, which he thinks is based upon fortuitous rather than necessary differences, Carpenter introduces one that pleases him better. In substance, he argues that dialectic and rhetoric differ, not because both arts do the same thing in different ways, but because each art does essentially different things.

Perhaps the main issue in this controversy will be clearer if we approach it in another way. The immediate question which Carpenter raises is whether or not rhetoric should control the art of amplification. Now amplification is a part of the more comprehensive art of literary composition, and this art has for its object the production of all forms of artistic discourse, whether spoken or written. Other parts of this art are conventionally known as invention, arrangement, and style, if indeed we can think of style as separate from amplification. The ancients added two other parts to the art of oral composition, or oratory. Memory and delivery, they believed, must be included in the scope of the art that seeks to furnish instruction in public speaking, since public speaking requires every faculty that written discourse requires, and in addition presupposes that the speaker shall communicate with his audience by means of the spoken word. Therefore, the art of oral composition, viewed as a whole, comprises invention, arrangement, style, memory, and delivery.[10]

With this explanation in mind, we are prepared to see what Carpenter has done. The special sciences, he believes, are the disciplines which give the speaker or writer something to say, which

[10] The Latin theorists customarily divided the subject of rhetoric into these five parts and made this division the framework of their treatises. See Cornificius (?), *Rhetoricorum ad C. Herennium Libri IV*, 1.2.3; Cicero, *De Inventione*, 1.7.9, and *De Oratore*, 1.15.64; Quintilian, *Institutio Oratoria*, 3.3.1-3. See also C. S. Baldwin, *Ancient Rhetoric and Poetic* (1924), 21-2, 40-55, 64. The precise origin of these five conventional divisions is a matter of conjecture. See A. S. Wilkins, *M. Tulli Ciceronis De Oratore Libri Tres* (Oxford, 1892), 57. Aristotle, it is true, mentions that rhetoric is divisable into invention, arrangement, and style. See *Rhetoric*, 1403^{b}1-15. But the real framework of his treatise on rhetoric is an analysis of the three means of persuasion available to the speaker.

encourage, in a word, the invention of ideas. Dialectic teaches the art of amplification and arrangement, and prepares the speaker to present what he has to say. Rhetoric teaches adornment—the refining and polishing of style.

Viewed in this way, rhetoric and dialectic appear as different arts, each contributing its own qualities to the completed literary product. The alternative view, suggested by Zeno and fully expressed by other writers, implies that rhetoric and dialectic are different methods of doing the same thing. Rhetoric, that is to say, is a complete art of composition, and in its own right furnishes instruction in invention, arrangement, style, memory, and delivery. Dialectic is also a complete art of composition. It also surveys the subjects of invention and arrangement. Style is less important to the philosophic reasoner than to the popular speaker, largely because the relation of each to the audience addressed is different, and hence this part of composition, as well as memory and delivery, is not a significant component of dialectic. But basically both arts work toward the same end and consider all common means which are pertinent to the accomplishment of that end. The difference between them arises from a difference in the audience which each addresses, and in other circumstances that surround their use.

In the rest of our discussion, we shall attempt briefly to trace the history of these two attitudes toward rhetoric and dialectic. Carpenter's view, we shall see, was foreshadowed in Plato's criticism of rhetoric. The same notion attracted but did not wholly convince the eclectic Cicero. Toward the end of the Middle Ages it became, however, the prevailing distinction between rhetoric and dialectic, and we find it frequently expressed in the writings of Carpenter's immediate predecessors. The alternative distinction, we shall observe, was proposed by Aristotle. Cicero regarded the Aristotelian view with some hesitation, but he tended on the whole to believe that rhetoric is not so much a limited phase of the process of composition as a complete process in itself. Quintilian adopted and even carried to an extreme the theory which Aristotle had announced, and during the Renaissance this theory was again propounded in the works of Cox, Wilson, and Francis Bacon.

V

Plato's indictment of rhetoric can be largely explained in terms of his preference for dialectic. Hunt says: "For Plato, dialectic was the whole process of rational analysis by which the soul was led into

the knowledge of Ideas."[11] If the speaker is to have ideas worthy of the philosopher-statesman, he must use dialectic as the means of inventing, testing, and arranging the substance of his speeches. Rhetoric begins to function as an art after the subject matter of a speech has been discovered and put in order. Socrates says to Phaedrus:

> Perhaps, however, rhetoric has been getting too roughly handled by us, and she might answer: What amazing nonsense is this! As if I forced any man to learn to speak in ignorance of the truth! Whatever my advice may be worth, I should have told him to arrive at the truth first, and then come to me. At the same time I boldly assert that mere knowledge of the truth will not give you the art of persuasion.[12]

With this passage, Socrates begins to construct a theory of rhetoric. We shall not do violence to his meaning if we conclude that the discovery of material in the rhetorical process is outside of and antecedent to the function of this art. Where, then, does invention belong? A remark in the *Philebus* gives us a clue. When Protarchus asks, "And what, then, is dialectic?" Socrates replies: "Clearly the science which would know all that knowledge of which we are now speaking; for I am sure that all men who have a grain of intelligence will admit that the knowledge which has to do with being and reality, and sameness and unchangeableness, is by far the truest of all."[13]

Socrates also attributes one other distinctive function to dialectic. He says: "I am a great lover of these processes of division and generalization; they help me to speak and think. And if I find any man who is able to see unity and plurality in nature, him I follow . . . And those who have this art, I have hitherto been in the habit of calling dialecticians."[14] Dialectic, in short, is also the art of arrangement. If rhetoric has anything to do with arrangement, its precepts are derived from dialectic.

Hunt summarizes in the following words Plato's view of dialectic and rhetoric:

> After all, the sum and substance of Plato's suggestions for rhetoric is that rhetoric, if it is really to be an art, must coincide with philosophy. When Plato said that the rhetorician must be a dialectician, he meant that he must be a philosopher. So far as he differs from the philosopher, he is an imposter; so far as he coincides with him, his art of rhetoric is superseded.[15]

[11] E. L. Hunt, "Plato and Aristotle on Rhetoric and Rhetoricians," *Studies in Honor of Winans*, 53.

[12] *Phaedrus*, 260. B. Jowett's translation here and below.

[13] 58.

[14] *Phaedrus*, 266; see also *Sophist*, 253.

[15] *Studies in Honor of Winans*, 53.

And Wilkins passes a similar judgment:

> But for the most part he [Plato] is concerned only with relegating Rhetoric to its proper place as an appendage or handmaid to Dialectic; and protesting against the current views as to its nature and functions.[16]

Cicero's attitude toward rhetoric and dialectic is in part Platonic. Here and there Cicero seems inclined to admit that the faculty of invention in the process of composition is properly within the scope of dialectic. This art also has the function of determining the nature of particulars. To Torquatus Cicero says that dialectic is "an art which by itself contains the whole science both of perceiving what the real subject is in every question, and also of judging what the character of each thing is."[17]

This statement becomes the central idea of Cicero's *Topics*. Every precise method of arguing, he observes in this treatise, has two divisions: invention, and judgment. The Stoics have given their attention to the second. "They have diligently considered the methods of carrying on a discussion by that science which they call dialectics; but the art of discovering arguments, which is called topics, . . . they have wholly disregarded."[18] Cicero proposes to devote his treatise to the question of invention as well as judgment, in accordance, he admits, with the method of Aristotle's *Topics*.

Then in the *Orator*, which is mainly concerned with the third part of composition, or style, Cicero briefly passes over invention and arrangement.[19] He says that a mastery of these two faculties is indispensable to the speaker. To invent what you will say is as it were the mind in the body, but this subject belongs to prudence rather than to eloquence. Arrangement is also important. Skill and labor, however, count for more in style than in invention and arrangement. Indeed, the most important consideration facing the speaker is how his ideas are to be uttered. This problem falls under two headings: action, and style. Later, Cicero distinguishes between a disputation and a speech. The dialectician, it seems, controls the method of discussing and talking; the speaker, the method of delivering and embellishing. These two methods are neighboring and contiguous. But the orator is advised to master the whole system of

[16] *De Oratore*, 39.

[17] *De Finibus*, 2.6.18. C. D. Yonge's translation.

[18] *Topics*, 2.6. (Yonge).

[19] The following summary of Cicero's treatment in the *Orator* of these two parts of composition is based upon the succeeding passages: 14.44; 15.50; 16.50-1; 17.55; 32.113-5.

disputation, apparently because it teaches him things that he cannot hope to learn in a formal study of rhetoric.

Taking Cicero's rhetorical works as a whole, we find that he does not restrict rhetoric to the last stages of the process of composition. In the *De Inventione* and again in the *De Oratore* he makes invention and arrangement the most important elements in rhetoric, and relegates style, memory, and delivery to subordinate places. He even has Antonius say that dialectic will not help the orator because it "is too silent about the invention of arguments, and too full of words in pronouncing judgment on them."[20] This criticism is directed, not at Cicero's own system of dialectic, but at the system taught by Diogenes, the Stoic. Nevertheless, Cicero's own remarks on invention in the *Topics* are not all that he has to say on this subject, for he goes on in the *De Oratore* to make invention the most important single constituent of rhetoric. He here shows no tendency, in fact, to restrict rhetoric to the treatment of style and delivery, and to transfer invention and arrangement to dialectic.

During the later Middle Ages, the belief that dialectic contributes invention and arrangement to the art of composition, and rhetoric merely style and delivery, was by all odds the prevalent conception. Thus John of Salisbury in the *Metalogicon* (*circa* 1159) makes the discovery of subject matter in composition the task of dialectic.[21] It apparently does not occur to him that rhetoric can claim a similar function. Agricola (1443-1485) defines dialectic as the "art of speaking in a probable manner concerning any topic which can be treated in a speech." [22] Rhetoric in his system is the study of style. That part of composition which discovers and judges belongs to dialectic.[23] Peter Ramus (1515-1572) takes an even more extreme position; more extreme because he articulates the idea more fully. He defines rhetoric "as 'the art of effective speaking,' and limits its divisions to 'expression' and 'action.' He altogether ignores 'invention' and 'arrangement,' together with 'memory,' which is really a reflection of them, on the ground that these topics belong more properly to

[20] *De Oratore*, 2.38.160. J. S. Watson's translation.

[21] C. Webb, *Ioannis Saresberiensis Episcopi Carnotensis Metalogicon Libri IIII* (Oxford, 1929), 66-7. For a summary of this work and a statement of John's attitude toward rhetoric, see C. S. Baldwin, *Medieval Rhetoric and Poetic* (1928), 156-72.

[22] D. L. Clark, *Rhetoric and Poetry in the Renaissance* (1922), 56. For Agricola's words, see R. Agricola, *De Inuentione Dialectica* (Paris, 1535), II.12.

[23] *De Inuentione Dialectica*, I.11; II.3-4.

logic, even if all five divisions are given by the ancient writers."[24] Ramus divides dialectic into invention and arrangement. "The former division of the subject, which he defines as that of 'inventing the arguments,' is concerned with the separate parts of which the subject is composed. The latter, defined as 'the suitable arrangement of the things invented,' deals with the combination and classification of these parts in the completed presentation."[25] A contemporary of Ramus, Omer Talon, whose *Institutions Oratoires* appeared just before 1550, takes a similar position when he divides rhetoric into style and delivery.[26]

The influence of Ramus and Talon was widely felt in England. In 1584, Dudley Fenner wrote *The Artes of Logike and Rhetorike.* This book, a comprehensive treatise on composition, discusses invention and arrangement as the constituent parts of "Logike"; the "Rhetorike" is devoted to style and delivery.[27] Abraham Fraunce in 1588 also finds it advisable to treat the art of composition under two separate headings. His *Lawiers Logike* divides into invention and arrangement; the *Arcadian Rhetorike* is confined to delivery and style.[28] Meanwhile, those who wrote only on rhetoric limited the subject to exclude invention and arrangement. Richard Sherry's *A Treatise of Schemes and Tropes* (1550) makes style the important constituent of the art of rhetoric.[29] Henry Peacham's *The Garden of Eloquence* (1577) views rhetoric as coextensive with figurative language. Charles Butler's earlier work on rhetoric, the *Rhetoricae Libri Duo* (1598), divides the subject into style and delivery.[30]

These writers realize that the basic stages in the process of composition are invention and arrangement. Their position is simply that these stages belong outside the field of rhetoric, and within the scope of dialectic. Once the process of composition, viewed in its entirety, had been broken up in this way, and its traditional parts

[24] F. P. Graves, *Peter Ramus* (1912), 136. See also C. Waddington, *Ramus* (Paris, 1855), 352.

[25] Graves, *Ramus,* 148. See also Waddington, *Ramus,* 369.

[26] W. P. Sandford, *English Theories of Public Address, 1530-1828* (Columbus, 1931), 51-2. See also Waddington, *Ramus,* 352.

[27] Sandford, *English Theories,* 53-4. See also L. Cox, *The Arte or Crafte of Rhethoryke* (A reprint, ed. by F. I. Carpenter, Chicago, 1899), 34.

[28] Sandford, *English Theories,* 55-7.

[29] Sandford, *English Theories,* 36-40.

[30] The first words of this work are: "Rhetorica est Ars ornatè dicendi. Partes Rhetoricae duae sunt Elocutio & Pronunciato." See *Rhetoricae Libri Duo* (London, 1642), 1. See also Sandford, *English Theories,* 60-2; 104-7.

distributed between rhetoric and dialectic, these writers felt that they had arrived at an adequate definition of the relation of these two ancient arts.

VI

We mentioned earlier that there were two ways of looking at the relation of dialectic and rhetoric. Having traced the one from Plato to the Renaissance, we are now ready to consider the other. This second view regards rhetoric and dialectic as related but independent arts, each with its own system of invention and arrangement, each in itself a complete mode of composition, each differing from the other by virtue of the circumstances in which it is used. According to this view, rhetoric is essentially the art of addressing a popular audience, dialectic the art of addressing a learned audience. It is conventional, of course, to think of dialectic as a discourse in which two speakers address each other by question and answer, and of rhetoric as a continuous discourse by the speaker; but this difference is hardly fundamental. Public speakers are not always accorded the privilege of speaking without interruption, and dialecticians who follow the example of Socrates may frequently neglect to pause for the reply of the opponent. But the distinction which is founded on a conception of the difference between the learned and the popular audience is both comprehensive and fundamental. This view allows both rhetoric and dialectic to speculate on invention and arrangement, and on any other element common to all discourse. Propounded by Aristotle, this distinction earned, as we have seen, the qualified support of Cicero. Let us now consider in somewhat greater detail the treatment which this theory received from Aristotle, Quintilian, and the writers of the English Renaissance.

VII

Cope's able survey of the relation of demonstration or science to dialectic and rhetoric in Aristotle's works,[31] and Hunt's provocative statement of the same subject,[32] are more comprehensive studies than the one we shall undertake. Our summary of Aristotle's treatment of dialectic and rhetoric will be a brief general estimate.

Aristotle says that both rhetoric and dialectic are "faculties for

[31] See E. M. Cope, *An Introduction to Aristotle's Rhetoric* (London and Cambridge, 1867), 67-99.

[32] See *Studies in Honor of Winans*, 55-7.

providing arguments."[33] Invention is thus an important element in each. Aristotle's *Rhetoric* is mainly an analysis of the three types of proof available to the speaker, and hence it tacitly deals with what the Romans were later to call *inventio*. This work, too, considers style and arrangement. Aristotle's *Topics* also treats invention and arrangement. Cope says: "The object of the entire system of the Topics is to find arguments and to dispose them ... in such a way as to carry your point, and reduce your adversary to silence."[34]

In what other ways are the two arts similar? Both use a common method, so far as each aims at demonstration. Dialectic uses the syllogism, the apparent syllogism, and the induction; rhetoric the enthymeme, the apparent enthymeme, and the example.[35] Each is available for defense or for attack on the same occasion, and can be used to derive an affirmative or negative verdict. Both aim, not at absolute truth, but at the nearest approach to truth under the circumstances. The materials which each uses are similar. Both are concerned "with such things as come, more or less, within the general ken of all men and belong to no definite science," with probabilities, with matters that call for discussion, with subjects that we have to "deliberate upon without arts or systems to guide us," with issues which present us with alternative possibilities, with contingencies, with human actions, with the universal as opposed to the special lines of argument.

Rhetoric and dialectic, then, use a common method of demonstration and apply themselves to the same general class of subjects. But they do not exactly coincide—Aristotle, it must be remembered, devotes a separate work to each. What attempt does he make to differentiate them?

The answer to this question is implied in the tenor and direction of the *Topics* and *Rhetoric*. Dialectic, according to Cicero's *Topics* (2.6), is a careful method of arguing *(ratio diligens disserendi)*. This phrase applies equally well to Aristotle's similar work. Here we find set forth the principles that govern the discussions of experts. Such arguments may be carried on by question and answer, or delivered without interruption; but in essence they are designed for the

[33] *Rhetoric*, 1356ª30-5. W. R. Robert's translation here and below. See vol. XI of *The Works of Aristotle* (translated into English under the editorship of W. D. Ross, Oxford, 1924).

[34] *Introduction*, 75.

[35] In this paragraph we have in mind the following passages in Aristotle's *Rhetoric*: 1356ᵇ1-18; 1355ª35; 1355ª15f; 1354ª1f; 1355ª5-15; 1356ᵇ35f; 1357ª1; 1357ª5,15,25; 1358ª3-35.

learned audience, and the system of invention and arrangement used in preparing them is organic with this kind of hearer.

The *Rhetoric*, on the other hand, deals with the kind of proof that is addressed to the popular audience. Aristotle says: "The duty of rhetoric is to deal with such matters . . . in the hearing of persons who cannot take in at a glance a complicated argument, or follow a long chain of reasoning," and later he repeats: "We assume an audience of untrained thinkers."[36] Rhetorical invention and arrangement meet the requirements of this kind of situation. The popular audience offers the speaker an emotional and moral, as well as an intellectual resistance. The audience must be put into the right frame of mind by what the speaker says; it must be led by his words to see that he is credible and trustworthy; it must be made to see that his position is sound. The kind of invention and arrangement necessary to the accomplishment of these objectives will differ from the corresponding faculties in dialectic. The situation which the dialectician faces requires him to overcome a purely intellectual resistance, whereas the rhetorician goes on to deal with the passions and personalities of men. Hence, the *Rhetoric* includes a treatment of the invention of emotional and ethical proof—two subjects completely overlooked in the *Topics*.

The arrangement of a speech differs also from the arrangement of a dialectical argument.[37] The order in which a speaker unfolds his discourse is determined by the state of mind of the popular audience. What arrangement will make the hearers receptive, gain their good will, remove prejudice? What order should be followed when the opposition has not yet revealed its stand? What order when the opposition has already spoken? These and other similar questions are discussed in the last few chapters of the *Rhetoric*. The dialectician, on the other hand, arranges his arguments in such fashion as to convince the opponent, to reveal the intellectual soundness of one position, the weakness of the other. Whether the hearers are persuaded or not is to him a matter of indifference.

VIII

Quintilian also believes that rhetoric and dialectic are related modes of composition. His thinking is influenced by Aristotle and Cicero; yet it possesses a fervor and originality all its own. Aristotle dispassionately analyzes both arts; Cicero cannot refrain from

[36] *Rhetoric*, 1357°1-4, 12.

[37] Compare *Rhetoric*, 3.13-9, with *Topics*, 8.1-3.

transferring his sympathies from one to the other; but Quintilian's enthusiastic preference for rhetoric never flags, and he belittles dialectic even while admitting that the two arts have separate methods of invention and arrangement.

He avers that geometry is as necessary to the orator as to the dialectician, for "what is the aim of oratory if not proof?"[38] Rhetoric must be an art if we allow dialectic to be one; the two differ in species, not in genus. Philosophers discuss the good, the useful, and the just, and even lay prior claim to these subjects. But Quintilian urges:

> that philosophers only usurped this department of knowledge after it had been abandoned by the orators: it was always the peculiar property of rhetoric and the philosophers are really trespassers . . . Since the discussion of whatever is brought before it is the task of dialectic, which is really a concise form of oratory, why should not this task be regarded as also being the appropriate material for continuous oratory?

In these passages Quintilian compares rhetoric with dialectic because he wishes the former to appear in good company. Once she is accepted at court, however, she can snub her former associate. Quintilian says:

> Consequently, since there are two kinds of speech, the continuous which is called rhetoric, and the concise which is called dialectic (the relation between which was regarded by Zeno as being so intimate that he compared the latter to the closed fist, the former to the open hand), even the art of disputation will be a virtue. Consequently there can be no doubt about oratory whose nature is so much fairer and franker.

The difference between rhetoric and dialectic arises from the difference between the audiences with which each works.

> For in the former we are confronted with learned men seeking for truth among men of learning; consequently they subject everything to a minute and scrupulous inquiry with a view to arriving at clear and convincing truths, and they claim for themselves the tasks of invention and judgment. . . We on the other hand have to compose our speeches for others to judge, and have frequently to speak before an audience of men who, if not thoroughly ill-educated, are certainly ignorant of such arts as dialectic: and unless we attract them by the charm of our discourse or drag them by its force, and occasionally

[38] *Institutio Oratoria,* 1.10.38. Butler's translation here and below. See *The Institutio Oratoria of Quintilian with an English translation,* by H. E. Butler [in The Loeb Classical Library] (London, 1921-2). In the following summary of Quintilian's treatment of rhetoric and dialectic, we have in mind these passages in the *Institutio Oratoria:* 2.17.42; 2.21.13, and the preface, 11-20; 2.20.7; 5.14.28-31; 12.2.11; 3.3.1-15.

throw them off their balance by an appeal to their emotions, we shall be unable to vindicate the claims of truth and justice. Eloquence aims at being rich, beautiful and commanding, and will attain to none of these qualities if it be broken up into conclusive inferences which are generally expressed in the same monotonous form . . . Eloquence therefore must not restrict itself to narrow tracks, but range at large over the open fields. Its streams must not be conveyed through narrow pipes like the water of fountains, but flow as mighty rivers flow, filling whole valleys; and if it cannot find a channel it must make one for itself.

Philosophy, Quintilian admits, is allied to oratory, and from dialectic, which is one part of philosophy, the orator has something to learn. Dialectic is wholly employed with words: it defines terms, clears ambiguities, disentangles perplexities, separates falsehood from truth, and teaches how to establish and refute propositions. But its audience, he stresses again, is not the audience which a speaker addresses, and hence rhetoric cannot be a mere copy of dialectic. The orator's task

is not merely to instruct, but also to move and delight his audience; and to succeed in doing this he needs a strength, impetuosity and grace as well. For oratory is like a river: the current is stronger when it flows within deep banks and with a mighty flood, than when the waters are shallow and broken by the pebbles that bar their way.

In these passages, Quintilian recognizes the existence of a methodology of disputation, with its own system of invention and judgment. But invention that will serve dialectic, he implies, will not accomplish the purposes of rhetoric. Hence rhetorical invention can hardly be a subsidiary phase of dialectic, but must fall within the scope of a treatise on rhetoric; and arrangement, style, memory, and delivery must with even greater justification be counted among the subjects which the speaker shares with but does not surrender to the dialectician.

IX

During the early Middle Ages, rhetoric flourished as the dominant member of the *Trivium,* despite the rival claims of dialectic. From the seventh to the tenth centuries of our era, grammar usurped the place of greatest prominence in the programme of liberal studies; after that, dialectic became the most important,[39] and without much question assumed control over invention and arrangement—two subjects which earlier had also belonged to rhetoric. In this atmosphere, rhetoric might easily have disappeared as an art. Instead, the mediaeval writers, in some measure conscious of the former importance

[39] Baldwin, *Medieval Rhetoric and Poetic,* 151, 90-1.

and comprehensiveness of this art, rationalized its claims to recognition among the seven liberal disciplines, and concluded that its proper place was in the realm of style and delivery. This view obviously dominates Carpenter's argument, and explains, as we have seen, the position of many of his predecessors. But already the influence of Aristotle and Quintilian was being felt, and a broader definition of the scope and importance of rhetoric was being formulated.

In *The Arte or Crafte of Rhethoryke* (*circa* 1530), Leonard Cox began to restore to rhetoric the parts which his immediate predecessors had assigned to dialectic. He says the good speaker must know how to invent, to judge the sufficiency of invention, to arrange, and to speak in a pleasant and delectable manner.[40] He is not sure how far rhetorical invention is independent of dialectic. Sandford says that Cox

> is a little uncertain about the dividing line between rhetoric and logic. He names four kinds of speeches, 'Logycall, whiche kynde we call properly disputacion,' 'Demonstratyue,' 'Delyberatyue,' and 'Judiciall,' but immediately qualifies his statement by adding, 'and these thre laste be properly callid speces or kindes of oracions.' So again, after explaining the 'places' of logic, he says, 'But as concernynge the crafte to fourme argumentes whan thou hast founde them in theyr places that must be lerned of the Logician where he treateth of the fourme of Sellogismes Enthimemes and Inductions,' and with delightful inconsistency with his general emphasis on the primary importance of invention, declares also, 'the sure Judgement of argumentes or reasons muste be lernyd of the Logicyan but the crafte to set them out with plesaunte fygures and to delate the matter longith to the Rhetorycian.'[41]

But Cox is aware that rhetoric is not altogether the study of style and delivery, and hence he breaks with the late mediaeval tradition.

Wilson's *Arte of Rhetorique* (1553) teaches invention, disposition, style, memory, and delivery.[42] Here the classical canon is completely reëstablished; rhetoric is again a whole art of composition, not a subsidiary branch of the process. Wilson also wrote on dialectic, and the two divisions into which he makes this art fall are reminiscent of Cicero's *Topics*. In naming the two parts of dialectic, he says:

> The first parte standeth in framyng of thinges aptly together, and knittyng woordes for the purpose accordyngly, and in Latine is called *Iudicium*. The seconde parte consisteth, in findyng out matter, and searchyng stuffe, agreable to the cause, and in Latine is called *Inuentio*.[43]

[40] Cox, *Rhethoryke* (ed. by Carpenter), 43.

[41] *English Theories*, 31-2.

[42] T. Wilson, *The Arte of Rhetorique* (ed. by G. H. Mair, Oxford, 1909), 6.

[43] *The Rule of Reason*, fol. 2.

The fact that rhetoric and dialectic in Wilson's view exercise joint control over invention causes him to look for some means of discriminating between the habitual uses which each art makes of this common element. His subsequent distinction is hesitant and far from complete, and he does not seem altogether to reject the view that rhetoric is style. He admits that dialectic and rhetoric are "muche like"; then, after referring to Zeno's metaphor, he says that dialectic is occupied with "al matters," and nakedly and plainly sets forth what rhetoric expresses with "freshe colours, and goodly ornamentes."[44] But in the main a liberal attitude toward rhetoric is implicit in his treatment of these two arts.

In the *Advancement of Learning* (1605), Francis Bacon discredits still further the theory that rhetoric is merely the art of style. According to Sandford, the revival of classical rhetoric in seventeenth-century England was largely influenced by Bacon.[45] The general truth of this statement can hardly be questioned. An analysis of Bacon's treatment of dialectic and rhetoric shows, indeed, a sympathetic understanding of the rhetorical doctrines of Aristotle. Bacon considers the study of style apart from matter a "distemper" of learning. He deprecates barren distinctions among sciences, and quotes with approval Cicero's complaint that when Socrates separated rhetoric from philosophy, rhetoric became an empty and verbal art. He treats invention as a part of rhetoric and of dialectic. And his final distinction between the two arts is that rhetorical method is derived from a study of the audience, whereas dialectical method has regard only for the abstract perfection of argument.

A systematic study of Bacon's attitude toward rhetoric and dialectic cannot here be undertaken.[46] The preceding paragraph contains a general estimate of his position. We shall proceed now to select from the *Advancement of Learning* those passages which particularize his views.

Style, Bacon thinks, cannot profitably be considered apart from subject matter. As part of the general effort to assert the dignity of knowledge and to remove prejudices against studious pursuits, he speaks of the three distempers of learning. One of these dis-

[44] *The Rule of Reason*, fol. 3.

[45] *English Theories*, 96. See also by the same author: "English Rhetoric Reverts to Classicsm, 1600-1650," *Q.J.S.*, XV (1929), 507, 510-13.

[46] For a detailed study of this subject, see K. Wallace, *Bacon's Theory of Public Address* (Cornell University doctoral dissertation, typewritten manuscript, 1933).

tempers he calls "delicate learning," as manifested in "vain affectations," and he attributes it to four causes.

> The admiration of ancient authors, the hate of the schoolmen, the exact study of languages, and the efficacy of preaching, did bring in an affectionate study of eloquence and copie of speech, which then began to flourish. This grew speedily to an excess; for men began to hunt more after words than matter; and more after the choiceness of the phrase, and the round and clean composition of the sentence, and the sweet falling of the clauses, and the varying and illustration of their works with tropes and figures, than after the weight of matter, worth of subject, soundness of argument, life of invention, or depth of judgment . . . Here therefore [is] the first distemper of learning, when men study words and not matter... for words are but the images of matter; and except they have life of reason and invention, to fall in love with them is all one as to fall in love with a picture.[47]

To say that dialectic should equip the speaker to invent and arrange subject matter, and that rhetoric should only study adornment, is to draw a shallow distinction between these arts. Bacon states this in the passage just quoted, and reverts later to the same theme. Commenting on his own categorical arrangement of learning, he wishes that

> all partitions of knowledges be accepted rather for lines and veins, than for sections and separations; and that the continuance and entireness of knowledge be preserved. For the contrary hereof hath made particular sciences to become barren, shallow, and erroneous; while they have not been nourished and maintained from the common fountain. So we see Cicero the orator complained of Socrates and his school, that he was the first that separated philosophy and rhetoric; whereupon rhetoric became an empty and verbal art.[48]

The second book of the *Advancement of Learning* discusses the various branches of knowledge. Rhetoric and dialectic occupy an important position. Each is an art of invention. Invention, in the most general sense, deals with the discovery of new arts and sciences, and with the unearthing of arguments. Both rhetoric and dialectic contribute to this second function. The invention of subject matter in speaking and writing, Bacon affirms, is not really a discovery but a resummoning of knowledge for a specific use; and he advises:

> To procure this ready use of knowledge there are two courses, Preparation and Suggestion. The former of these seemeth scarcely a part of Knowledge, consisting rather of diligence than of any artificial erudition. . . Pleaders should have the Places whereof they have most continual use ready handled

[47] J. Spedding, R. L. Ellis, D. D. Heath, *The Works of Francis Bacon* (Boston, 1860-5), VI, 119-20. Cited below as *Works of Bacon.*

[48] *Works of Bacon,* VI. 236.

in all the variety that may be. . . But the nature of the collection of this provision or preparatory store, though it be common both to logic and rhetoric, yet having made an entry of it here, where it came first to be spoken of, I think fit to refer over the further handling of it to rhetoric.[49]

A ready-made collection of such arguments as the speaker is likely to need is, then, the first part of the art of resummoning or inventing arguments, and Bacon half-heartedly assigns it to rhetoric. The second part, which Bacon calls "Suggestion," belongs exclusively to dialectic. He thinks of this as a system of precepts that will aid the speaker in searching for the arguments he wants to find; it directs us to "certain *marks* or *places*, which may excite our mind to return and produce such knowledge as it hath formerly collected, to the end we may make use thereof."[50] "Neither may these Places serve only to apprompt our invention, but also to direct our inquiry. For a faculty of wise interrogating is half a knowledge."[51] Bacon significantly adds that this type of invention is "that which the schools call Topics," and thus he identifies it again with the art of dialectic, and more particularly with Aristotle's and Cicero's *Topics*.

When Bacon comes at length to a direct discussion of rhetoric, he does not concern himself with a treatment of its conventional parts.[52] Rather, he wishes to "stir the earth a little about the roots of this science." "In true value," he says, "it is inferior to wisdom . . . yet with people it is the more mighty: for so Salomon saith, *Sapiens corde appellabitur prudens, sed dulcis eloquio majora reperiet* . . . signifying that profoundness of wisdom will help a man to a name or admiration, but that it is eloquence that prevaileth in an active life." Rhetoric, he goes on, has received excellent theoretical treatment from Aristotle and Cicero, while in the speeches of Demosthenes and Cicero we find its precepts admirably exemplified.

What, then, is the special function of this art? "The duty and office of Rhetoric is *to apply Reason to Imagination* for the better moving of the will." Bacon's meaning here depends upon his previous analysis of human conduct. The will, he believes, is governed by reason and emotion. If the passions were normally obedient to reason,

[49] *Works of Bacon*, VI. 269-70. Bacon's whole discussion of "this provision or preparatory store" of arguments is instructive. See also H. H. Hudson, "Can We Modernize the Theory of Invention?" *Q.J.S.E.*, VII (1921), 325-34, and L. Cooper, *The Rhetoric of Aristotle an Expanded Translation* (1932), xxiii-xxxv.

[50] *Works of Bacon*, VI. 270.

[51] *Works of Bacon*, VI. 270-1.

[52] The subsequent discussion is based on *Works of Bacon*. VI. 206-300.

"there should be no great use of persuasions and insinuations to the will, more than of naked proposition and proofs." But the passions are unruly. They look only to the present and fill the imagination with an attractive picture of immediate good. Their appeal to the will is insistent and overpowering. Reason presents to the imagination the vision of ultimate good, and this appeal is less lively. By enlivening the vision of ultimate good, rhetoric acts to check the superior force of present desire, and hence man's will is made partially obedient to the reason.

Rhetoric takes its place beside ethics and dialectic. Reason is prevented from controlling the will by three obstacles: sophistry, weakness of imagination, and strength of passions. Bacon continues:

> Neither is the nature of man so unfortunately built, as that those powers and arts should have force to disturb reason, and not to establish and advance it: for the end of Logic is to teach a form of argument to secure reason, and not to entrap it; the end of Morality is to procure the affections to obey reason, and not to invade it; the end of Rhetoric is to fill the imagination to second reason, and not to oppress it: for these abuses of arts come in but *ex obliquo*, for caution.

Here, then, is the basis for a distinction between rhetoric and dialectic. Bacon later sets forth some specific differences.

> It appeareth also that Logic differeth from Rhetoric, not only as the fist from the palm, the one close the other at large; but much more in this, that Logic handleth reason exact and in truth, and Rhetoric handleth it as it is planted in popular opinions and manners. And therefore Aristotle doth wisely place Rhetoric as between Logic on the one side and moral or civil knowledge on the other, as participating of both: for the proofs and demonstrations of Logic are toward all men indifferent and the same; but the proofs and persuasions of Rhetoric ought to differ according to the auditors. . . which application, in perfection of idea, ought to extend so far, that if a man should speak of the same thing to several persons, he should speak to them all respectively and several ways.

These quotations plainly show the direction of Bacon's thinking. We have not space for a discussion of other aspects of his treatment of rhetoric. Perhaps, however, it would be well to add that, in his categorical arrangement of learning, the four studies respecting man's reason are largely within the provinces of rhetoric and dialectic. Invention, the first of these studies, is in part concerned with resummoning knowledge on specific occasions; and, as we have seen, dialectic shares this part with rhetoric. Judgment is the second of these studies, and Bacon assigns it to dialectic. The third study is the art of preserving knowledge and has to do with writing and

memory. The art of transmitting knowledge is the fourth. This consists of the organ of transmission, or speech and writing; the method of transmission, which belongs to dialectic; and the "illustration" of transmission, or the energizing of knowledge, which is the function of rhetoric. Viewed in this way, rhetoric recaptures much of its lost vitality and regains in large measure its former dignity.

X

Carpenter's essay on rhetoric and dialectic, then, carries to an extreme a theory that originated in the brilliant inquiries of Plato, and influenced subsequent thinking at intervals throughout history. Never permanently accepted and never altogether discredited, this view has been responsible for the temporary eclipse of rhetoric as a discipline in the liberal arts curriculum, for the momentary ascendancy of dialectic as the chief art of composition, and for the persistent belief, common today among certain teachers of speaking and writing, that rhetoric, properly so-called, should be the art of delivery, of gesture, of style, of acrobatics, of intonation, of charm, while invention and arrangement should belong to other arts. The alternative view of rhetoric, which we have also briefly traced, has had its periods of ascendancy and its moments of oblivion. Aristotle among the Greeks, Cicero and Quintilian among the Romans, and Bacon among the writers of the Renaissance, are chiefly responsible for its authority and value.

DEVELOPMENT AND APPLICATION OF A METHOD FOR MEASURING THE EFFECTIVENESS OF INSTRUCTION IN A BASIC SPEECH COURSE*

LEE NORVELLE,
Department of Speech, Indiana University

I. Purpose of this Study

OUR examination of the recent development of objective methods of measuring effectiveness in speaking shows that standardization in this field has not kept pace with the development in other

* Submitted in partial fulfillment of the requirements for the degree Doctor of Philosophy, Indiana University.

academic subjects. There is therefore a definite need for the development of a method for determining the effectiveness of a speaker which may also be used to measure the rate of his improvement. It is the purpose of this study:

A. To develop such a method.

B. To make an application of the standard in class room instruction.

II. Method Employed

1. Development of the standard.[1]

In 1922 the writer became interested in developing some plan by means of which he could teach a fundamental speech course more effectively. This study has been based on the assumption that the best criterion of the effectiveness of any given speech is the reaction of the particular audience before which it is presented, and that one of the important factors in improving one's ability to speak effectively is that of making a careful analysis of the speeches of others as they are given. The problem presented was that of selecting a method by which a group judgment could best be secured and also of providing a basis for determining what had contributed to the effectiveness and what had mitigated against it. Because of the lack of unanimity of opinion on the part of those whose special task it is to evaluate the various elements that make up an effective speech the problem of determining the *most effective elements* was not an easy one. The first step taken was that of making an examination of the twelve leading texts in public speaking and listing the elements that were stressed as the most essential to effective speaking. These elements were considered from two points of view; first, from the emphasis placed upon each by the author; and second, from the agreement of the various authors as to their relative importance.

The second step in developing a scale for measuring the effectiveness of a given speech consisted of securing from ten of the writer's colleagues in the speech department at the University of Iowa the eight elements which they considered to be the most im-

[1] The standard used in this experiment was developed in 1924. Since that time it has been used in the fundamental speech course at Indiana University to determine the ability and rate of improvement of students in this course. The gathering of data used in this study extended over a period of five years with approximately 100 students examined each year.

portant in evaluating the different phases of effective speaking. These points were discussed in staff meetings when we were attempting to develop—as far as possible—a uniform grading system for the required course in public speaking given at that institution.

The third step in developing this scale was to determine the points on which persons who served as judges of various speaking contests based their judgments in selecting the winners. During two years of serving as a judge in different kinds of speaking contests, the writer noted the points on which the judges based their decisions. Observations were made of fifty-five different persons' judgments. These judgments came from people engaged in various occupations. Seventeen were members of speech departments in colleges, universities, or high schools. Twelve were members of English departments of colleges, universities, or high schools; nine were teachers of subjects other than Speech or English in colleges, universities, or high schools. Eleven were practicing lawyers. Four were business executives and the remaining two were ministers.

The fourth step in trying to ascertain the elements which make up an effective speech appeal was to secure from fifty prominent speakers a statement of what they considered to be the eight most important factors in successful speaking. These were to be listed in the order of their importance.

The fifth step was to secure from a group of thirty-two men, who composed the membership of the Speakers' Club of Davenport, Iowa, an opinion on the most effective elements in successful speaking. None of these men were professional speakers. They were all business and professional men who were interested in developing their ability as speakers. They met weekly and spoke in rotation. They secured the services of a teacher of speech to criticize each speech as it was given. These men were asked to list in the order of their importance the eight elements which they considered most essential in speaking effectively.

The sixth step was to ask sixty-seven students in three sections of advanced public speaking to state in the order of their importance the eight most essential elements in effective speaking. These students were all upperclassmen and many of them were majors in speech.

The purpose of this phase of the study was to get a representative group judgment. It was thought that judgments of twelve authors and the reactions of the five groups of persons would be more truly

representative and valuable than the reactions of the same number of teachers of speech.

The results of these observations and requests were then tabulated and the ten points occurring most often in the total of the 214 lists submitted were selected as being the most important by consensus of judgments. These ten points were then arranged in the following order with the instructions for rating a given speech printed at the top of the page.

FORM FOR RATING THE EFFECTIVENESS OF A SPEAKER

Instructions

This form is used for the purpose of rating the auditor's reaction to a given speech. You are to grade each of the ten points, on a scale from 0-100. Let 0 equal the worst type of speaking which you ever heard and 100 equal the best type which you ever heard. 50 represents average. State as briefly and as explicitly as possible your reasons for each rating on the solid lines. Make your notations as the speech progresses but do not grade until near the end. (Read carefully the explanatory statements which are presented with this form.)

Speaker ..... Date .....
Subject ..... Purpose .....
Your interest in subject: As announced..... As presented.....

1. *Ideas:* Number, selection, arrangement, development, clear, definite, appropriate, varied, original, appreciable.....
   Reasons .....
2. *Language:* Diction, style, pronunciation, structure, accuracy, discrimination, simple, imaginative, provincial, colloquial, slang.....
   Reasons .....
3. *Audibility:* Easily heard, indistinct, too much intensity, breathy, too fast, sloven pronunciation, clear enunciation.
   Reasons .....
4. *Directness:* Looks at and talks to group, communicative, objective attitude, sensitive to reaction of audience. .....
   Reasons .....
5. *Agreeableness:* Pleasing voice, characteristics, pitch, intensity, quality, rhythmic; friendly, sincere attitude; not over aggressive; neat appearance.
   Reasons .....
6. *Emphasis:* Vocal intensity on important word or phrase, pauses, physical reaction to idea as expressed, animation. .....
   Reasons .....
7. *Naturalness:* No affectation of voice or movement, attention on content not on self, no distracting mannerisms. .....
   Reasons .....
8. *Poise:* Possesses self-confidence, not visibly nervous, mental and physical coordination, secures confidence of auditor. .....
   Reasons .....

9. *Position:* Stands easily erect, assumes different positions, graceful, transitions at thought changes. .....
   Reasons .....
10. *Gesture:* Eye to eye contact, facial expression, coordinated hand and arm-gesture, suits action to word. .....
   Reasons .....

Auditor.....

The following explanatory statement was presented with each rating form and persons using the forms were asked to become thoroughly familiar with the suggestions offered.

Consider the following instructions carefully when rating the speech of another and also when preparing and delivering your own speech.

SPEAKER .....
NAME OF PERSON PRESENTING SPEECH

DATE .....
DATE ON WHICH SPEECH IS DELIVERED

SUBJECT .....
TITLE OF SPEECH WHICH IS TO BE DELIVERED

1. *Ideas.*

You are to pass judgment upon the nature and number of the ideas presented. It is possible that the speaker may not include some of the most pertinent ideas pertaining to the subject, or he may present more than is necessary under existing conditions. Judgment concerning the logical arrangement of the ideas is to be included in this evaluation, also.

2. *Language.*

You are to pass judgment upon the appropriateness of the diction and phraseology used by the speaker. The nature of the subject and of the occasion should guide you in determining what is most appropriate. There is a distinct oral style which is necessary for effectiveness in speaking. Oral style includes unity, coherence, and emphasis the same as does written style. There must also be brevity, spontaneity, sincerity, enthusiasm, and originality. If these important elements are overlooked, the speaker cannot hope to speak in an effective manner.

3. *Audibility.*

Can you hear the speaker easily? His first responsibility is to speak loudly enough to be heard easily by all present. Inaudibility is a common fault among speakers, especially beginners. It is important that every word be spoken with enough intensity and clearness to carry the idea or segment of idea to you. You should not have to exert yourself in order to catch his words. The duty of the speaker is to speak in a manner so that he not only can be heard but in such a manner that he will be heard.

4. *Directness.*

Do you feel as if the speaker is addressing you personally? If he is to speak in the most effective manner, he must make each auditor think that he is addressing him personally. One of the chief faults of beginning speakers is that of not looking directly at the entire group. Some ignore the group altogether by looking at the floor, ceiling, sidewalls, or out of the window, while others fix the line of gaze on a particular section and ignore the rest of the group. The speaker's eye should include the group as a whole. Directness, however, is not limited to the problem of looking at the entire group. It is also necessary that the speaker exercise certain voice elements and physical attitudes that will attract the favorable attention of the group.

5. *Agreeableness.*

Considered from the standpoint of pitch, intensity and quality, is the effect of the speaker's voice agreeable to you? It is highly desirable that the speaker have an agreeable voice quality. Many speakers who are splendid thinkers and show marked ability in arranging their material are not effective as speakers because they possess disagreeable voice quality. A nasal twang, high pitched voice, guttural sounds, etc., are some of the more common causes of disagreeableness. Does the attitude of the speaker seem agreeable? Is he over-aggressive? Is he neat in appearance?

6. *Emphasis.*

Do you consider that the important words and ideas are properly emphasized? In every speech there are certain ideas which are to be made emphatic. These are the ideas which form the structure work of the speech. If the auditor is to remember the content of the talk, he must be impressed with the value and relationship of these pertinent ideas. These can best be brought before the auditor through an increase of intensity, pause, change of inflection, gesture and a reasonable degree of repetition and cumulation.

7. *Naturalness.*

Does the speaker impress you favorably by being natural in his presentation? Many people fail to realize that all speech making, in order to be effective, must be conversational in nature. Many elements of affectation manifest themselves through the voice and bodily action when one is delivering a speech. Naturalness is that type of expression which attracts least attention to its *manner.* Here the auditor is to rate the speaker on the conversational method of delivery.

8. *Poise.*

Does the speaker appear at ease and seem to derive social pleasure from presenting the speech? Poise is the general mental and physical bearing of the speaker before his audience. If he appears to have complete control of himself, and does not suffer from timidity and stage fright, the auditor may conclude that the speaker has sufficient poise.

9. *Position.*

Is the position of the speaker such that it causes you to feel that he has a definite objective? Position is the way a speaker stands. He should stand

easily erect and in such a manner as to permit him to change his position with a minimum amount of action. Many speakers take a fixed position. This is bad form. In order to appear free and easy on the floor, the speaker should step forward, backward, or to either side as the transitions in thought may necessitate.

10. *Gesture.*

Is the bodily movement of the speaker, when considered as a whole, such as to emphasize the ideas as expressed in words? Gesture is any bodily movement which is used to emphasize the thought of the speaker. Often the auditor considers that gestures are confined to the use of the hands; such is not the case. Some of the most effective gestures are made with the eye, the face, and the head. The speaker should never overwork his hands and arms in an attempt to meet the auditor's expectations of gesture.

2. Application of the standard.

a. *Preliminary study.* The standard was first used in connection with the Davenport Speakers' Club and in three advanced public speaking sections at the University of Iowa.

The ten points which comprise the rating plan were discussed before each group and the members were instructed to consider each point in terms of their experience in listening to various speakers. The fact that the scale ranged from 0-100 with 50 as average was strongly emphasized in order to overcome the tendency to consider 75 as average as is the case in determining school grades. The fact that each person should be governed in making his ratings by his own experience rather than by the suggestions or ratings of others, was stressed. It was pointed out that there would be considerable range in the group evaluations of each factor because of individual differences and experiences. Each auditor was asked to follow the speech closely and make notations on the line marked "reasons" as the speech progressed but not to formulate the numerical evaluation until near the close of or at the end of the speech. After considering all the factors entering into the speech situation which had a direct bearing upon any of the given points, he was to give a numerical evaluation, representing his judgment of the effectiveness of each. Every member of the group was to rate each speech given in the series, thus in a group of twenty-five students each one would be rated by twenty-four others. At the end of each speech the auditors were given a brief period in which to finish making and recording their evaluations. Then the rating sheets were collected by the speaker. He was asked to add the ratings for each point and to determine the average. This would enable him to determine the

extent of his ability on each of the ten points as revealed by the judgment of the group.

The next step was to graph the results. This was done for the purpose of emphasizing his average on each factor. It was believed that this procedure would be valuable to the speaker in that it would enable him to see how far above or below the median he had been rated by the members of the audience on each point.

With these instructions the plan was presented to the three sections in advanced public speaking and to the members of the Davenport Speakers' Club. Each auditor was requested to register his reaction to the speech, as given, as definitely as he could. The writer would record a criticism of the speech as it was given and check the reaction of the group with his own evaluation when the graph was presented to him.

The results were very enlightening. In each case the speaker's weak and strong points were presented to him in a most effective manner. When a speaker realized that the majority of the group had rated him below average on a point he became more interested in his own improvement in that particular direction than when the same thing was presented to him orally by some member of the group or by the instructor. One of the most important results coming from the preliminary use of this rating plan was *the added incentive given to each member of the group for improvement, and the increased interest which these measurements aroused in the class room procedure.* Previous to the introduction of the rating plan the more interested students were competing with each other without definite visible results and the less interested students were going along in a perfunctory manner, but when the graphs were completed and studied, each student became more interested and tried to surpass his own record. This, from the standpoint of the writer, was the most definite and valuable result of the preliminary study.

3. Application of this standard for evaluating the effectiveness of a speaker and his rate of improvement in the basic speech course.

With the observations of this preliminary study in mind the writer set about to adapt this plan of evaluating the effectiveness of a given speech to the basic speech course at Indiana University. The problem here differed from that used with the advanced groups because they were composed of persons who had received considerable training in speech work. The problem in the basic course was to get an intelligent evaluation of points from the beginning group.

It was decided not to have any ratings made until the entire group had developed some skill in determining the effectiveness of a speech. Three series of speeches were given by the individual members of each section. All of these were criticized by the instructor at the end of each series. Names were not identified with criticisms, and the members of the group wrote their impressions of the speeches as they were given. The first half of the semester was devoted to writing and giving of these oral criticisms. A bibliography of readings from various speech texts was also given to the class. These were read and their contents discussed. Each member of the class was also required to make an analysis of three public speeches before he began to rate the members of his section.

At the beginning of the last half of the semester each member of the group was required to present a ten-minute extempore speech. Copies of the rating plan were presented to the group and their use explained. The fact that there must be a brief and definite statement made concerning each rating was emphasized. The students were told that an unusually low or high rating on any point would be considered of little or no value unless explanatory remarks accompanied it on the line marked "reasons." This was done to facilitate accuracy in rating. Another important step in facilitating accuracy was in making clear to each student that the rating which he gave to any other speaker would have no effect whatever upon the speaker's semester's grade but that he, the rater, would be penalized for gross errors in rating. All rating sheets were to be handed in at the time the graphs were submitted and if it was found that in the case of error in grammar, lack of organization, etc., the ratings were average or above and no mention made of these weaknesses, the person making such a rating would be required to explain his failure to observe them. The result was that mistakes of this nature were reduced to a minimum and when made, it was the exception rather than the rule and the speaker's average on that particular point would be indicative of his effectiveness regardless of this exception in rating. This method also kept the law of retaliation from being exercised to an appreciable extent.

Since the ratings given by the members of the class were not used in determining the semester's grade, there was no incentive for a student to mark a friend high on any point unless he actually felt he deserved such a rating. Neither was there any incentive to mark anyone lower on a given point than he deserved since such

a rating would mitigate against the rater rather than against the person rated. This precaution safeguarded against prejudiced and careless ratings.

When the series of speeches were being given, no oral comments were made by the instructor or students. Each person was asked to rate the various speakers on each of the ten points according to his own judgment after he had carefully considered the rating form and the accompanying explanations. As soon as the series was ended the graphs were made in duplicate, one of which was presented to the instructor, the other kept by the student. The rating sheets from which the graphs had been made were presented with the graph. This enabled the instructor to check for accuracy and to get a check on the individual ratings.

Each student was called in by the instructor for a personal conference, at which time his graph was examined and his weak and strong points discussed. By referring to the comments listed under "reasons" on the various rating sheets the student could easily determine why he had been rated as he had. This was particularly valuable in the case of the low ratings for he became conscious not only of his deficiencies but also of their causes. This information enabled him to work more intelligently toward the mastery of his difficulties.

After the conference with the instructor on the graph for the first speech the student was requested to select another subject, similar to, yet distinct from, in subject matter, the one on which he had been rated, and to attempt to improve on all points, particularly on those on which he had been rated lowest on the first speech. At the expiration of a period of six weeks the student presented a second speech before the class which was rated in the same manner as was the first one. The results were then recorded on the same graph sheet with those of the first speech and a comparison was made of the two speeches. This enabled the student to determine easily his actual improvement or lack of improvement on each point on which he was being rated by his audience. This proved to be a definite incentive to increased effort and to greater improvement because it showed the student where his real weakness was and in what respects he was most effective. The first necessary prerequisite to further and continued improvement in any case of learning is that of being able to measure the progress made and also to determine the factors upon which it depends.

Results and Discussion

1. Consideration of initial scores of entire 500 cases on each of the ten traits, Table I.

Table I is a summary showing initial scores and improved scores for the entire group of 500 subjects (250 men, 250 women) as judged on the traits of: (1) Gesture, (2) Emphasis, (3) Directness, (4) Position, (5) Naturalness, (6) Audibility, (7) Poise, (8) Agreeableness, (9) Language, and (10) Ideas. The traits were arranged in order (from low to high) as determined by the initial ratings.

TABLE I.

Summary Table Showing Initial Scores and Improved Scores for Group of 500 University Subjects (250 Men and 250 Women) Obtained in the Basic Course in Speech Training, as Judged on the Traits of: (1) Gesture, (2) Emphasis, (3) Directness, (4) Position, (5) Naturalness, (6) Audibility, (7) Poise, (8) Agreeableness, (9) Language, (10) Ideas.

	TOTAL 500 Cases	*250 Men*	*250 Women*	*Initial Score After Training*	*Initial Score After Training*	*Initial Score After Training*
Gesture	51.6	56.2	51.5	54.8	54.8	60.7
Emphasis	52.9	57.8	55.3	58.4	54.0	60.7
Directness	55.1	61.1	67.8	61.5	52.5	60.7
Position	55.4	60.1	51.9	59.5	59.0	60.7
Naturalness	55.5	61.7	53.5	61.9	57.5	61.5
Audibility	55.7	61.1	60.9	63.4	50.5	60.7
Poise	56.5	62.7	55.5	61.5	57.5	63.0
Agreeableness	57.4	57.7	56.9	57.0	58.5	59.0
Language	58.1	62.1	58.4	61.9	57.8	62.3
Ideas	60.6	63.7	59.8	63.4	61.5	64.0

The table also shows the initial scores and improved scores of the men (250 cases) as contrasted with those of the women (250 cases).

Considering the part of the table which deals with the total 500 cases we find that the trait on which the entire group was scored the lowest is gesture. This reaction seems consistent with class room experience in a beginning course. The average beginner, in such a course, usually has much difficulty with gestures in two ways. First, it is difficult for him to determine the proper amount of physical

action to use in delivering his speech, and second, it is difficult for him to execute, properly, the physical action which he does inject into the delivery of his speech. As a rule he is very self-conscious and the result is that there is too much constriction of the muscles to permit him to inject sufficient bodily action into his delivery. Also, when the muscles are highly constricted it is impossible for the speaker to execute well the gestures which he does inject. Under such conditions all movement seems so stilted and unnatural that instead of emphasizing the ideas as expressed in words it actually detracts from them because of the clumsy way in which it is executed. Another probable reason for a beginning speaker's difficulty with gesture is that he suffers from the false notion that all effective gesture must be made with the hands and arms. After observing others and through personal experimentation during the delivery of a speech, he learns that *all* bodily action which emphasizes the idea as expressed in words, is gesture, and that the most effective gestures often come as a result of eye, face, head and total bodily movements. When he learns this fact, it is much easier for him to improve his gestures.

The trait on which the total group was marked second lowest is emphasis. When one considers the correlation between gesture and emphasis, this reaction also seems consistent. Gesture is one of the important factors in producing emphasis. In the oral presentation of ideas, emphasis is gained in three main ways: by increasing vocal intensity, by the use of pauses, and by the use of gesture or bodily action. Since gesture is one of the chief ways of creating emphasis it seems natural that a low rating on the former would make for a relatively low rating on the latter.

The third lowest trait for the entire group is directness. Again there is a close correlation between this and the two preceding traits. Directness is gained, primarily through getting and developing a central idea, logical organization, selection of proper words, eagerness on the part of the speaker to communicate his idea to the audience in the most effective manner, emphasis on important points, through gesture, pleasing voice characteristics, pitch, intensity, quality, formal conversational attitude toward audience and looking directly at the group. One of the chief difficulties with beginning speakers is the over-emphasizing of unimportant words and ideas and the lack of emphasis on important words and ideas. It is interesting to note that the factor criticized most often in the entire group was the failure to look directly at the audience.

The fourth trait on which the group was marked lowest is position. There is not a high degree of correlation between gesture, emphasis and position, but there is between directness and position. In order for the speaker to be most direct it is necessary that he stand in an easily erect position, preferably with the weight suspended on the forward foot and the relaxed foot slightly back of the one sustaining the weight and forming a forty-five degree angle with it. This will enable the speaker to move in any direction with a minimum amount of effort, and it also makes for a graceful balance of the body—head up, chest expanded, arms in repose at sides, and the body inclined slightly forward. The speaker should be physically alert and agile as well as mentally so.

The fifth trait for the group is naturalness. There is a high degree of correlation between this trait and the four preceding ones. Naturalness does not mean doing a thing in the same manner in which the speaker is accustomed to doing it. Rather, it means finding the best way of doing it and practicing until the best procedure becomes habitual and automatic. In this manner, only, is it possible to acquire the ability to employ that type of expression which attracts least attention to its manner. In speaking, as in all other types of acquisition and learning the most natural and easy method is that which is most highly co-ordinated and produced without manifestations of unnecessary effort. The higher a speaker is rated on the traits of gesture, emphasis, directness, and position, the higher will be his rating on naturalness.

Another point to be noted in connection with naturalness is that of affectation, particularly of voice and action. An over-consciousness of training often results in too pronounced physical action, especially hand and face gestures,—also in giving proper oral value to consonants and vowels. Speakers too often demonstrate a pronounced word consciousness which is distracting to the auditor.

The sixth trait is audibility. It is closely correlated with two of the preceding traits, emphasis and directness, and slightly correlated with naturalness. As was pointed out in the discussion of emphasis, one of the three main ways of making an oral statement emphatic is that of increasing vocal intensity. Many speakers fail to communicate, largely because they cannot be easily heard. On the contrary, some speakers use so much vocal intensity that they appear ridiculous. A speaker should realize that his first obligation to the audience is to speak in such a manner that not only *can* each member hear him but so that each member *will* hear him without

the delivery becoming bombastic or preachy. Audibility is not merely vocal intensity but it also depends, to a great extent, upon clear articulation and enunciation.

If one speaks in such a way as to make it difficult for his auditor to hear him he may be considered unnatural because of timidity or stage fright. And if he speaks in a bombastic manner he may be accused of being unnatural because of not employing an easy, forceful, conversational style of delivery.

The seventh trait is poise. This trait is obviously correlated very closely with all of the preceding ones. Since it has been defined as the "mental and physical bearing of the speaker," one easily sees its relationship to the other traits.

The eighth trait is agreeableness. This refers largely to voice characteristics; however, it also includes the total impressions made by the speaker upon his auditors and the manner in which these are made.

The ninth trait is language. There is little or no correlation between this trait and the preceding ones. The thing stressed most under this heading was correctness of grammatical construction and keen discrimination between words. The preceding eight traits are all concerned with form and manner of presenting ideas effectively. Hence, they are all correlated to some extent and most of them very closely. The last two deal with content. One's graphic language is better than his oral language. This seems queer in view of the fact that the average person uses the oral method in communicating ninety-five per cent of his ideas. But this pardox is explained by the fact that in many courses of study the graphic method is stressed almost entirely to the exclusion of the oral. One has the tendency to make his speech, good or bad, merely as a matter of fact; hence there is little or no conscious effort for improvement until he is made conscious of the need.

The tenth trait is ideas. The group was marked highest on this trait, as might be expected. This is accounted for in two main ways. In any well regulated basic course of speech training the factor stressed most is the necessity of having something to say. In the second place, all other courses contribute to this end. In speech, as in no other course, one can correlate his acquisitions in other fields of learning.

2. Consideration of amount of gain for total 500 cases in each of the ten traits measured. Table II.

TABLE II.

SUMMARY TABLE SHOWING EXTENT OF IMPROVEMENT FOR EACH OF THE TEN TRAITS MEASURED: (a) FOR TOTAL GROUP OF 500 CASES; (b) FOR TOTAL GROUP OF 250 MEN; AND (c) FOR TOTAL GROUP OF 250 WOMEN, (See Table I) ARRANGED FROM TRAIT SHOWING GREATEST IMPROVEMENT TO TRAIT SHOWING LEAST IMPROVEMENT.

	Ave. Improvement Total 500	*Ave. Improvement Women 250*	*Ave. Improvement Men 250*
Audibility	6.4	10.2	2.5
Poise	6.2	6.5	6.0
Naturalness	6.2	4.0	8.4
Directness	6.0	8.2	3.7
Emphasis	4.9	6.7	3.1
Position	4.7	1.7	7.6
Gesture	4.6	5.9	3.3
Language	4.0	4.5	3.5
Ideas	3.1	2.5	3.6
Agreeableness	0.3	0.5	0.1

Here the ten traits have been arranged from highest to lowest in order of actual gain.

On *audibility* the improved score for the total 500 cases was 61.7 as compared with 55.5 on the initial rating, a total gain of 6.2.

On *poise* the improved score was 62.7 as compared with 56.5 on the initial rating, a total gain of 6.2.

On *naturalness* the improved score was 61.7 as compared with 55.5 on the initial rating, a total gain of 6.2.

On *directness* the improved score was 61.1 as compared with 55.1 on the initial rating, a total gain of 6.0.

On *emphasis* the improved score was 57.8 as compared with 52.9 on the initial rating, a total gain of 4.9.

On *position* the improved score was 60.1 as compared with the initial rating of 55.4, a total gain of 4.7.

On *gesture* the improved score was 56.2 as compared with 51.6 on the initial rating, a total gain of 4.6.

On *language* the improved score was 62.1 as compared with 58.1 on the initial rating, a total gain of 4.

On *ideas* the improved score was 63.7 as compared with 60.6 on the initial rating, a total gain of 3.1.

On *agreeableness* the improved score was 57.7 as compared with 57.4 on the initial rating, a total gain of 0.3.

It is interesting to note that the entire group made the greatest gain on audibility and the least gain on agreeableness. Two factors account mainly, for the improvement in audibility. First, it is easy to convince the student that he is inaudible. When he looks over the rating forms and finds that those who sat in the rear of the group marked him lower on audibility than did those near the front he realizes that there is a definite need for more vocal intensity and most of the lack of audibility is due to insufficient vocal intensity. There are other factors, such as bad articulation, enunciation, nasality, careless pronunciation, etc., which make for inaudibility, but the greatest cause is lack in vocal intensity due to timidity and stage fright. This is especially true of women speakers. Second, it does not require a long period of training to produce perceptible increase in vocal intensity. One must not conclude from the above statements that audibility is not important in speaking, for the speaker must be heard before he can hope to be understood. Because of the nature of the trait it is easier, on the whole, to detect its inadequacy and to improve on it than on any of the other traits.

The lack of appreciable improvement on agreeableness is due to the nature of this trait. It involves the entire personality of the speaker in some respects and refers specifically to pleasing voice characteristics and the attitude of the speaker toward his audience. Because of the delicate and complicated physiological structure of the voice apparatus it is difficult to effect appreciable changes in pitch, intensity, quality, and inflectional control in a short period of time. Concentrated effort, extended over a considerable time period, is necessary to produce even minor changes in voice where delicate physiological readjustments are required. The failure to recognize this fact by those who strive to overcome speech defects, such as stuttering and stammering, is one of the chief difficulties in effecting a cure. The patient becomes discouraged before it is possible for perceptible improvement to be brought about. What has been said concerning the time element in improving voice characteristics holds equally true in the case of producing perceptible changes in other personality traits involved in speaking.

3. Consideration of initial scores, improved scores and resulting gains for the 25th percentile case, the 50th percentile case and the 75th percentile case of the entire 500 cases (250 men, 250 women), Table III.

An examination of the section of the table dealing with the total cases reveals that the 25th percentile made a greater gain on all traits

TABLE III.

SHOWING INITIAL SCORES, IMPROVED SCORES, AND RESULTING GAINS FOR THE 25TH PERCENTILE CASE, THE 50TH PERCENTILE CASE, AND THE 75TH PERCENTILE CASE OF A GROUP OF (a) 500 UNIVERSITY STUDENTS (250 MEN AND 250 WOMEN); (b) 250 MEN ALONE; (c) 250 WOMEN ALONE.

	Gesture	*Emphasis*	*Directness*	*Position*	*Naturalness*	*Audibility*	*Poise*	*Agreeableness*	*Language*	*Ideas*
TOTAL 500 CASES										
25th Percentile										
Improved	54.0	56.7	56.6	57.4	58.7	58.0	60.2	55.6	59.8	60.1
Initial	49.7	48.5	48.7	50.0	50.4	52.6	51.0	52.9	55.4	54.5
Gain	4.3	8.2	7.9	7.4	8.3	5.4	9.2	2.7	4.4	5.6
50th Percentile										
Improved	57.7	59.5	61.1	60.1	61.7	62.1	62.7	58.0	62.1	63.7
Initial	51.6	52.9	55.1	55.4	55.5	55.7	56.5	57.4	58.1	60.6
Gain	6.1	6.6	6.0	4.7	6.2	6.4	6.2	0 6	4.0	3.1
75th Percentile										
Improved	61.0	63.0	64.3	62.7	66.0	60.0	70.2	63.0	65.6	67.9
Initial	58.8	61.4	61.6	62.4	61.3	67.7	60.5	62.3	68.5	66.0
Gain	2.2	1.6	2.7	0.3	4.7	−7.7	9.7	0.7	−2 9	1.9
WOMEN 250 CASES										
25th Percentile										
Improved	56.5	57.5	55.0	56.5	57.8	57.8	60.3	56.5	59.8	60.3
Initial	50.9	48.3	46.5	49.0	50.0	48.3	50.0	51.5	55.9	56.5
Gain	5.6	9.2	8.5	7.5	7.8	9.5	10.3	5.0	3.9	3.8

50th Percentile										
Improved	60.7	60.7	60.7	60.7	61.6	60.7	64.0	59.0	62.3	64.0
Initial	54.8	54.0	52.5	59.0	57.5	50.5	57.5	58.5	57.8	61.5
Gain	5.9	6.7	8.2	1.7	4.1	10.2	6.5	.5	4.5	2.5
75th Percentile										
Improved	63.2	63.2	63.2	66.0	66.5	61.5	71.0	62.8	66.6	67.8
Initial	60.1	60.0	61.5	65.0	62.8	56.5	62.7	61.7	65.0	66.5
Gain	3.1	3.2	1.7	1.0	3.7	5.0	8.3	1.1	1.6	1.3
MEN 250 Cases										
25th Percentile										
Improved	51.8	55.0	58.5	56.3	59.7	60.0	58.5	55.0	59.7	60.0
Initial	48.5	48.7	51.0	49.7	50.8	57.0	52.0	54.0	55.0	53.5
Gain	3.3	6.3	7.5	6.6	8.9	3.0	6.5	1.0	4.7	6.5
50th Percentile										
Improved	54.8	58.4	61.5	59.5	61.9	63.4	61.5	57.0	61.9	63.4
Initial	51.5	55.3	57.8	51.9	53.5	60.9	55.5	56.9	58.4	59.8
Gain	3.3	3.1	3.7	7.6	8.4	2.5	6.0	.1	3.5	3.6
75th Percentile										
Improved	59.8	62.8	65.5	62.3	65.5	70.5	65.5	64.8	64.8	67.8
Initial	58.3	62.8	62.8	59.8	59.8	69.0	58.3	62.8	62.0	65.6
Gain	1.5	0.0	2.7	2.5	5.7	1.5	7.2	2.0	2.8	2.2

excepting gesture, audibility, and poise than did either the 50th or the 75th percentile.

The 50th percentile made a greater gain on all traits excepting poise and agreeableness than did the 75th percentile. The difference on poise is 3.5 while on agreeableness it is practically negligible, being only .1. The total rate of gain for the 25th percentile is almost a third greater than the gain for the 50th percentile and the gain for the 50th percentile is approximately two thirds greater than the gain of the 75th percentile. The total gain of the 50th percentile is more than twice that of the 75th percentile.

These findings are very pertinent in view of the fact that they are consistent with findings in other fields of learning where the nature of the acquisition makes possible the use of a more definite objective standard of measurement.

4. Consideration of semi-interquartile ranges (Q) for distribution of improved scores and initial scores of total 500 cases (250 men, 250 women), Table IV.

TABLE IV.

SHOWING SEMI-INTERQUARTILE RANGES (Q) FOR DISTRIBUTION[15] OF IMPROVED SCORES AND INITIAL SCORES OF TOTAL 500 CASES (250 MEN, 250 WOMEN).

TOTAL 500 Cases	*Gesture*	*Emphasis*	*Directness*	*Position*	*Naturalness*	*Audibility*	*Poise*	*Agreeableness*	*Language*	*Ideas*
Improved	3.5	2.1	3.9	2.6	3.6	1.0	5.0	3.7	2.9	3.9
Initial	4.5	6.4	6.4	6.2	5.4	7.5	4.7	4.7	6.5	5.7
WOMEN 250 Cases										
Improved	3.8	2.8	4.1	4.7	4.3	1.8	5.3	2.1	3.4	3.8
Initial	4.6	5.8	7.5	8.0	6.4	4.1	6.3	5.1	4.5	5.0
MEN 250 Cases										
Improved	4.0	3.9	3.5	3.0	2.9	5.2	3.5	4.9	2.5	3.9
Initial	4.9	7.0	5.9	5.0	4.5	6.0	2.1	4.4	3.5	6.0

[15] .....

Q's were obtained by means of the usual formula:

75th percentile score—25th percentile score.

Comparing the semi-interquartile ranges (Q) for distribution of the improved scores with those of the initial scores of the total cases, we find that in all of the traits, excepting poise, the Q's are lower in the improved scores than they are in the initial scores. On poise, the Q is .3 lower in the initial than in the improved. On many of the traits the Q's are as much as fifty per cent lower in the improved than they are in initial score. This means that the distribution of scores after training tends to be considerably less scattered or extended than it was before training. This difference may be attributed to two main causes: First, the improvement of the speaker who worked more intelligently at his task during the preparation and delivery of his second speech because of the information gained from the ratings of his first speech. Second, the individual improvement in judging on the part of those rendering the judgments, as a result of the experience and training they received in making the first ratings and also the training they received during the interim between the first and second rated speeches. In this respect the Q's throw some light on the consistency of the judges as a group.

The reader should keep clearly in mind that throughout the experiment the subjects were urged to give as careful attention to the task of analyzing and rating the speeches of others as they gave to the task of preparing and delivering their own speeches.

In the case of the women (250 cases) the Q's for the improved scores were, without exception, considerably lower than they were for the initial scores and for the men (250 cases) they were lower on all the traits excepting poise and agreeableness.

5. Comparison of initial scores, improved scores and resulting gains of the men (250 cases) with those of the women (250 cases), Table V.

Here the ten traits are listed from lowest to highest on the initial ratings the same as they were in Table I.

On gesture the initial score for men was 51.5, for women 54.8. The improved score for men was 54.8, for women 60.7, thus making a resulting gain for men of 3.3 and for women 5.9. The women were marked higher on the initial score and also made the greater gain. This is accounted for by the fact that women are more gifted in graceful and well co-ordinated movements and use facial expression in ordinary conversation to a greater extent than do men. Their desire to appear charming, especially before a group, is responsible, no doubt to a certain extent, for the initial score as well as for the resulting gain.

On emphasis the initial score for men was 55.3, for women 54.0.

The improved score for men was 58.4, the improved score for women, 60.7, thus making a resulting gain for men of 3.1 and for women, 6.7. The men were rated slightly higher on the initial rating than were the women. The resulting gain for the women was more than twice that of the men. The decided gain for women may be accounted for, largely, by the increase in vocal intensity. The lack of vocal intensity on the part of beginning women speakers is very pronounced, and since intensity is one of the most important factors in gaining emphasis, it is easily seen that they would be rated low on this element in the initial scoring. Intensity is easily gained and any increase becomes immediately perceptible.

TABLE V.

SUMMARY TABLE SHOWING COMPARISON OF AVERAGE INITIAL SCORES, AVERAGE IMPROVED SCORES, AND AVERAGE GAINS OF GROUPS OF 250 WOMEN AND 250 MEN.

	Initial Scores (Median)		*Improved Scores (Median)*		*Actual Gain*	
	Men	*Women*	*Men*	*Women*	*Men*	*Women*
Gesture	51.5	54.8	54.8	60.7	3.3	5.9
Emphasis	55.3	54.0	58.4	60.7	3.1	6.7
Directness	57.8	52.5	61.5	60.7	3.7	8.2
Position	51.9	59.0	59.5	60.7	7.6	1.7
Naturalness	53.5	57.5	61.9	61.5	8.4	4.0
Audibility	60.9	50.5	63.4	60.7	2.5	10.2
Poise	55.5	57.5	61.5	64.0	6.0	6.5
Agreeableness	56.9	58.5	57.0	59.0	.1	.5
Language	58.4	57.8	61.9	62.3	3.5	4.5
Ideas	59.8	61.5	63.4	64.4	3.6	2.9

On directness the initial score for men was 57.8, for women, 52.5. The improved score for men was 61.5, for women, 60.7, thus making a resulting gain for men of 3.7 and for women, 8.2. The men were rated much higher on the initial score than were the women and were rated slightly higher on the improved score.

On position the initial score for men was 51.9, for women, 59.0. The improved score for men was 59.5; for women it was 60.7, thus making a resulting gain for men of 7.6 and for women only 1.7. The

wide difference in this trait can be explained by the fact that women ordinarily give much greater attention to posture and position than do men. After the men had improved 7.6 per cent their score was still only five per cent above the initial score for women.

On naturalness the initial score for men was 53.5, for women it was 57.5. The improved score for men was 61.9 and for women it was 61.5, thus making a resulting gain for men of 8.4 and for women 4.0. It is seen here that the men made almost exactly twice the improvement that the women did. This, perhaps, is explained by the fact that women are normally more careful in exhibitory conduct than are men. When the attention of the men was called to the fact that they were being rated low they became more eager to improve on this trait. The improvement of the women was not so pronounced because they were not rated as low on the initial score.

On audibility the men were rated 60.9 on the initial rating and the women were rated 50.5. The improved score for men was 63.4 and the improved score for women was 60.7, thus making a resulting gain for men of 2.5 and for women 10.2. On this point we have the greatest difference on the initial scores and also the greatest difference in actual gain. The men made an actual gain of only 2.5 while the women made an actual gain of 10.2. The wide extent of difference in actual gain is accounted for by the fact that men normally speak with a greater degree of intensity than do women and intensity is one of the main factors in audibility. It is necessary for most women speakers to increase their intensity for both emphasis and audibility.

On poise the initial score for men was 55.5 and for women it was 57.5. The improved score for men was 61.5 and for women it was 64.0, thus making a resulting gain for men of 6.0 and for women, 6.5. There was not much difference on the initial scores and the degree of improvement was almost equal. The lack of sufficient degree of poise appears to be about uniform between the sexes and the adaptability of the sexes, so far as elements involved in poise are concerned, appears to be about equal.

On agreeableness the initial score for men was 56.9 and for women it was 58.5. The improved score for men was 57.0 and for women it was 59.0, thus making a resulting gain for men of only .1 and for women only .5. Here we have the least resultant gain for both groups. This trait, because of its complicated nature, seems most difficult to master. Many elements are involved and the range of each is rather extensive. Many of them are intangible. The trait includes much more than the three chief voice characteristics of pitch, intensity and quality. A fair degree of improvement in these alone would require

considerable time. There are also the elements of speaking attitude, physical characteristics, personal attire and other, though perhaps vague, yet evident, elements included in the term personality. After considering the nature of the elements involved in this trait one better comprehends the lacks of resulting gain, on the part of both groups in the limited period of time devoted to the individual sections during this study.

On language the initial score for men was 58.4 and for women it was 57.8. The improved score for men was 61.9 and for women it was 62.3, thus making a resulting gain for men of 3.5 and for women 4.5. The main points considered here, of course, were correctness of grammatical form and keen differentiations among the various shades of meaning of words. The men were scored a little higher on the initial ratings but on the improved ratings the women showed a slightly higher actual gain. This may be accounted for in part by the fact that the women were more self-conscious during the initial speeches than were the men and in part by the fact that women take a greater interest in mastering grammatical forms than do men.

On ideas the initial score for men was 59.8 and for women it was 61.5. The improved score for men was 63.4 and for women it was 64.4, thus making a resulting gain for men of 3.6 and for women 2.9. It is interesting to note here that women were marked higher on this trait on the initial score than were the men, but that the men scored a higher resulting gain than did the women. It will also be noted that both groups were scored higher on this trait in the initial rating than they were on any of the other traits. This may be accounted for by the fact that on this trait there was a greater transfer of acquisition from other courses than there could have been on any of the other traits.

The following figure shows, graphically, the comparative average gain of men and women on each of the ten traits.

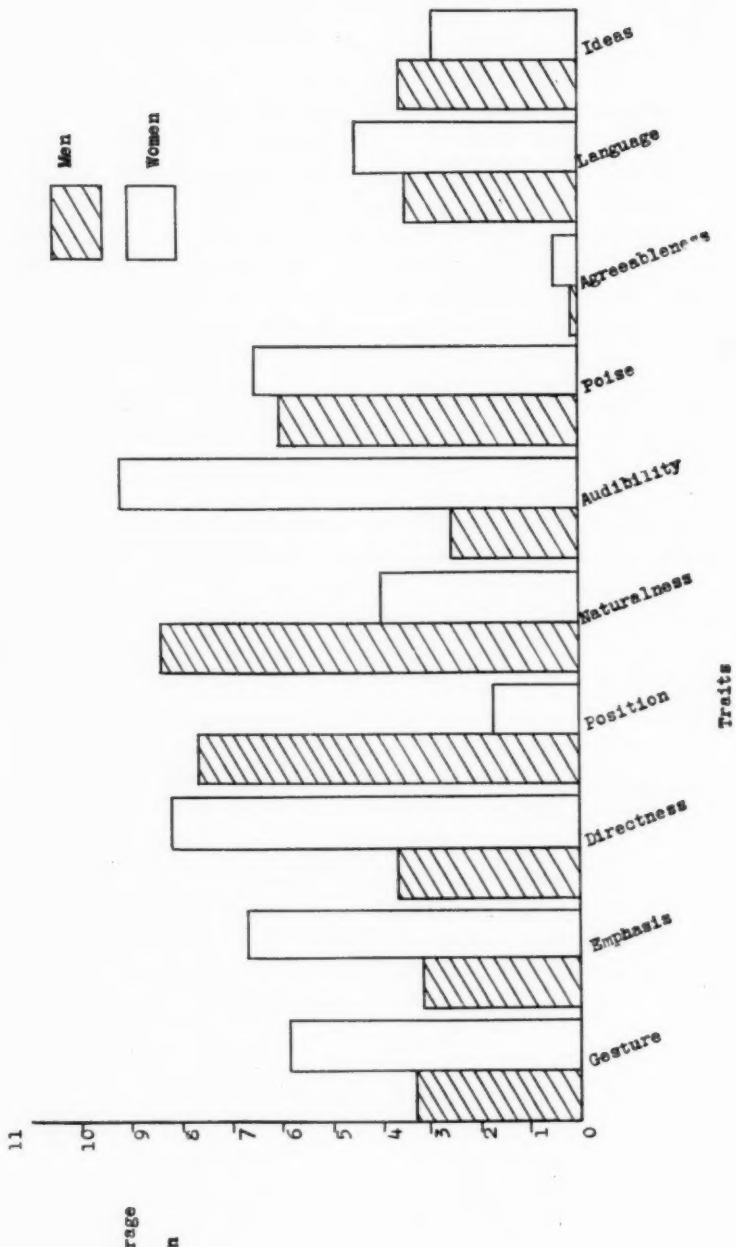


FIGURE I.
Showing AVERAGE GAIN after instruction in each of the ten traits for group of 250 Women and 250 Men. (Data obtained from Table V.)

V. Conclusions

The results obtained from this experiment seem to warrant the following conclusions, some of which should be of pertinent value to those interested in fundamental speech courses particularly designed to train students in effective speaking:

1. That the application of the method devised for this study provides a fairly accurate measurement of the several factors upon which effective speaking depends.
2. That this method provides a definite means for determining the rate of the individual speaker's improvement.
3. That through the use of this method the speaker can determine what factors contributed to his success or failure in his effort to speak effectively.
4. That by knowing to what extent he is limited in his ability to speak effectively and also by knowing what factors are limiting him, the student can work more intelligently at eliminating them.
5. That this method provides a means of securing the best criteria for evaluating the effectiveness of a given speech, i. e., the recording of definite responses on given factors, by each member of the audience while the speech is being presented.
6. That the factors which require a great amount of time and effort for individual improvement have been definitely determined and this information will make possible a more adequate class room procedure.
7. That, under the same conditions of training, women, on the whole, improve more rapidly than men.

RESEARCH CONTRIBUTION TO VOWEL THEORY

LEE EDWARD TRAVIS; W. R. G. BENDER, *Psychology Department;*
ARCHIBALD R. BUCHANAN, *Anatomy Department*
State University of Iowa, Iowa City, Iowa

Introduction

WE SHALL not attempt to give an historical summary of the theories of vowel production, dating from Dodart (1641). However, we may say very briefly that there are two main theories, the harmonic and the inharmonic. The harmonic theory of vowel production holds that the vocal cords generate a complex wave, having a fundamental and a large number of harmonics. A wave at its source will contain all of the frequencies that it will ever contain. The so-called resonating cavities act to magnify those fre-

quencies of the wave near the resonating frequencies of the cavities, the amounts of amplification depending upon the damping constants of the cavities. The reinforced frequency bands determine the vowel quality.

The inharmonic theory of vowel production holds that the sound wave, or series of puffs, from the vocal cords acts only as an agent for exciting the transient frequencies that are characteristic of the resonating cavities. Certain frequencies in the output wave need not be present in the source, but may be added by the resonating chambers. According to this theory the vocal cords emit puffs of air, each puff setting the air in the resonating cavities into vibration, resulting in the so-called cavity tones. The frequency of a cavity tone depends upon the resonating frequency of the cavity and is not dependent upon any frequency aspect of the exciting or cord tone. This vibration of the cavity tone soon diminishes until it is started anew by a second puff of air from the vocal cords.

Very recently Travis and Buchanan (1) found, from gross inspection of photographic records, that waves emanating from the head of a cadaver contained frequencies which were not present in the source waves. If the added frequencies were produced in the resonating cavities of the cadaver, then their results tended to support the inharmonic theory of vowel production. The purpose of the present study was not to offer final conclusions as to the validity of either the harmonic or inharmonic theory, but to continue the program begun in the former experiment.

Experimental Procedure

For the production of tones we used a General Radio beat frequency oscillator, type 613-B, and a specially constructed puff machine. For the modification of the tones we used the cadaver and the living subject. Tones were recorded by means of a condenser microphone with a built-in amplifier and a Westinghouse standard oscillograph element operated in connection with a high quality amplifier. Inasmuch as the oscillator is a standard instrument, it needs no description here. The essential feature of the puff machine was its ability to interrupt, periodically 180 times a second, a constant stream of air. This was accomplished by rotating, 60 times a second, a steel shaft containing three holes bored entirely through, and at right angles to the long axis of, the shaft. The holes, a quarter of an inch in diameter, were equally spaced in the same plane. The column of air was directed against the plane carrying the three holes.

[1] Travis, L. E., and Buchanan, A. R. "A Contribution to Vowel Theory." *Sci.* 77, No. 1987, 1833, pp. 121-122.

The part of the shaft containing the holes was mounted in a brass valve. The valve contained an input and an outlet, the former for leading the column of air against the revolving shaft, and the latter for leading the puffs out. The shaft was rotated by means of a 60-cycle alternating current motor. The pressure of the air column was 5 pounds per square inch.

In order to get a tone from the oscillator we used a Baldwin sound reproducer unit. The tones from this unit and from the puff machine were lead off, separately, by means of a small rubber tube with a lumen of 15 mm. and a length of 83 mm. The tube was bifurcated at the free end. The purpose of the bifurcation was to make it possible to record the sound coming from one of the bifurcated ends at the same time that the sound coming from the other bifurcated end was activating the resonating cavities, thus furnishing a check on the possible modification of the sound source by the resonating cavities. There was always a possibility that the additional column of air imposed upon the vibrating diaphragm of the Baldwin unit and the air puffs coming from the puff machine by the resonating cavities would produce changes in our source waves which might be interpreted as due to the passage of the source waves through the resonating cavities. By means of our bifurcated tube set-up we were able to photograph, successively during the production of the same sound, the sound waves actually led into the resonating cavities, as well as those emanating from those cavities. The possibility that any changes in wave form which we found might be due to reflected waves was ruled out on the basis of the fact that all relationships between objects in the room were the same for both the original input waves and those passing through the specimens.

Our cadaver presented normal nasal, oral, and pharyngeal cavities. The soft palate was so fixed as to present an opening into both the nasal and oral cavity. The specimen had teeth.

The rubber tube carrying the sound waves was inserted through the trachea into the larynx with its upper end just below the level of the true vocal cords. The head was suspended from the ceiling by small wires. The nose and mouth of the cadaver were placed directly in front of the microphone.

For the living subjects the tube carying the sound waves was inserted through the mouth into the back part of the oral cavity. With the tube thus furnishing the source of sound, the subject placed his tongue, soft palate, jaw, lips, etc., in characteristic positions for the production of the various vowel qualities.

The frequencies used in the present study were 100, 200, 300, 400, and 500~ from the oscillator and 180~ from the puff machine.

The order of photographic procedure was, first, to photograph the sound from one of the bifurcated tubes when both of these tubes were free; second, to photograph the sound emanating from the mouth and nose of the cadaver, or the living subject, when one of these tubes was inserted into the trachea (cadaver) or mouth (living subject) and the other tube was free but shielded from the microphone; and third, to photograph the sound coming from one tube which was free with the other tube either in the cadaver or living subject which was shielded from the microphone. The puff machine was used only with living subjects. The sound waves were analyzed to twenty components by means of the Henrici harmonic analyzer. Before analysis the sound picture was placed in a projection lantern and individual wave lengths were enlarged to a scale of 400 mm.

Data

Tables 1, 2, and 3 show the results obtained from the harmonic analysis of our sound records. Two things are indicated from a study of the data. First, the cavities affect the source waves, and second, these waves as thus affected are altered in their passage through the cavities.

Discussion

It is not difficult to produce, experimentally, conditions assumed in the harmonic theory of vowel production. In the present experiments it seems that we have fulfilled the requirements for testing this theory. It is difficult, if not impossible, to produce, experimentally, the conditions assumed in the inharmonic theory of vowel production. Even if it were possible to produce, experimentally, these conditions, the method of Fourier harmonic analysis, which is the one commonly used in studies of this sort, is not applicable to the results obtained under the conditions assumed in the inharmonic theory of vowel production. This fact was recognized by Helmholtz (2), but was apparently overlooked by later investigators who assumed that the harmonic analysis proves the composition of vowels to be reinforced overtones from the glottis. Scripture (3, 4, 5), particularly, has emphasized the unsatisfactory results of harmonic analyses of vowel curves.

In the present study we were justified in using the Fourier harmonic analysis because our source waves were relatively periodic.

[2] Helmholtz, H. L. F. *Sensations of Tone.* London: Longmans, Green & Co., 1895 (Trans. by A. J. Ellis.) pp. XIX, 574.

[3] Scripture, E. W. *Researches in Experimental Phonetics.* Carnegie Institution of Washington. Publ. No. 44, Press of Gibson Bros., 1906, p. 204.

[4] Scripture, E. W. *The Elements of Experimental Phonetics.* New York: Chas. Scribner's Sons. 1902. p. 696.

[5] Scripture, E. W. "The Nature of the Vowels." The *Phys. Soc.* (Univ. Press, Cambridge), June 19, 1931 p. 47.

TABLE I

PERCENTAGE DISTRIBUTION OF ENERGY IN PARTIALS; (CADAVER)

Partials	200 dv Oscillator Tone			300 dv Oscillator Tone			400 dv Oscillator Tone		
	2 tubes free: 1 tube end to microphone.	One tube free: 1 to cadaver; cadaver to microphone.	One tube to cadaver; the free tube to microphone.	2 tubes free: 1 tube end to microphone.	One tube free: 1 to cadaver; cadaver to microphone.	One tube to cadaver; the free tube to microphone.	2 tubes free: 1 tube end to microphone.	One tube free: 1 to cadaver; cadaver to microphone.	One tube to cadaver; the free tube to microphone.
1	99.4	94.4	98.3	99.1	95.2	98.7	98.4	89.1	97.7
2	.5	4.8	1.5	.8	4.4	1.1	1.5	10.8	2.2
3	.1	.6	.2	.1	.2	.1	.0	.0	.0
4	.0	.0	.0	.0	.0	.0	.0	.0	.0
5	.0	.0	.0	.0	.0	.0	.0	.0	.0
6	.0	.0	.0	.0	.0	.0	.0	.0	.0
7	.0	.0	.0	.0	.0	.0	.0	.0	.0
8	.0	.0	.0	.0	.0	.0	.0	.0	.0
9	.0	.0	.0	.0	.0	.0	.0	.0	.0
etc.									

Our main findings, first, that the cavities affect the source waves, and second, that these waves, as thus affected, are altered in their passage through the cavities, indicate that the voice-producing mechanism is a closed system, the various parts of which have interactive effects. There is good reason to suppose that the waves or puffs generated by the vocal cords not only affect, but also are affected by, the resonating system. The vocal cords, or generating mechanism,

TABLE II

PERCENTAGE DISTRIBUTION OF ENERGY IN PARTIALS: SUBJ. TR
200 dv Oscillator Tone

	"ah"			"oo"		
Partials	2 tubes free: 1 tube end to microphone.	One tube free: 1 in mouth TR to microphone.	One tube in mouth the free end to 'phone.	Two tubes free: 1 tube end to microphone.	One tube free: 1 in mouth TR to microphone.	One tube in mouth, the free end to 'phone.
1	99.4	96.0	99.4	99.4	96.0	98.9
2	.5	3.2	.4	.5	3.9	1.0
3	.1	.6	.1	.1	.0	.0
4	.0	.0	.0	.0	.0	.0
5	.0	.0	.0	.0	.0	.0
etc.						

and the resonating cavities, or the modifying mechanism, can not be considered apart from each other. It is possible, as has been emphasized by several workers that both theories are partially correct, their main differences concerning methods rather than facts.

References

Helmholtz, H. L. F. *Sensations of Tone.* London: Longmans, Green and Co., 1895. (Trans. by A. J. Ellis.) pp. xix, 574.

Scripture, E. W. *Researches in Experimental Phonetics.* Carnegie Institution of Washington. Publ. No. 44, Press of Gibson Bros., 1906. p. 204.

Scripture, E. W. *The Elements of Experimental Phonetics.* New York: Chas. Scribner's Sons, 1902. p. 696.

Scripture, E. W. "The nature of the vowels." The *Phys. Soc.* (Univ. Press, Cambridge), June 19, 1931. p. 47.

Travis, L. E., and Buchanan, A. R. "A contribution to vowel theory." *Sci.*, 77, No. 1987, 1933. pp. 121-122.

TABLE III

PERCENTAGE DISTRIBUTION OF ENERGY IN PARTIALS: PUFF MACHINE—FUNDAMENTAL 180 D.V.

	"ah"—subject KE			"aw"—subject TR			"oo"—subject TR		
Partials	2 tubes free: 1 tube end to micro-phone.	One tube free: 1 in mouth KE to mi-crophone.	One tube in mouth the free end to 'phone.	2 tubes free: 1 tube end to micro-phone.	One tube free: 1 in mouth TR to mi-crophone.	One tube in mouth the free end to 'phone.	2 tubes free: 1 tube end to micro-phone.	One tube free: 1 in mouth TR to mi-crophone.	One tube in mouth the free end to 'phone.
1	86.4	67.2	83.0	86.3	17.2	85.1	83.9	73.8	73.9
2	10.9	9.2	14.6	10.9	6.1	11.5	12.9	24.0	20.1
3	1.8	7.4	1.9	1.9	75.1	3.0	2.7	.8	5.0
4	.3	15.6	.1	.3	.0	.1	.2	.2	5.0
5	.3	.0	.0	.3	.7	.0	.0	.9	.2
6	.0	.0	.0	.0	.5	.0	.0	.0	.0
7	etc.								

A PHOTOGRAPHIC STUDY OF THE USE OF INTENSITY BY SUPERIOR SPEAKERS

MAX D. STEER *AND* JOSEPH TIFFIN
University of Iowa, Iowa City, Iowa

IN RECENT years there has developed a definite attempt to solve some of the basic problems of speech through the use of the objective techniques employed in the experimental phonetics laboratory. Studies have been made to determine objectively the various uses of pitch, intensity, duration, and quality as employed by superior and inferior speakers. The accumulated laboratory findings are becoming of increasing value to the teacher of speech.

Though much progress has been made in dealing with the various attributes of speech as sound, there seems to have been no attempt to relate the physical and grammatical analyses. To inform an instructor that a good speaker has a greater variation in intensity than an inferior speaker[1] undoubtedly is of importance. However, the instructor needs more specific information as to use of intensity and pitch by superior speakers. He wants to know, e.g., what parts of speech are given more intensity by such speakers. It is with this in mind that the authors have approached the problem of the use of intensity in connected discourse.

I. Problem

It has been the object of this investigation to discover first, the relative intensity placed upon the various parts of speech by several superior speakers, and second, the flexibility in intensity as used by these voices. It was felt that the best method for this study would be through an empirical approach.

The question as to the choice of superior speakers was carefully considered. Six speakers, five of whom are well-known radio announcers, and one, a professor of public speaking, were selected as subjects. General opinion and the approval of the investigators were the basis for the selection. The performers were Professors H. G. Barnes, Lady Esther, James Wallington, Lowell Thomas, the announcer for the Seth Parker Program, and Voice of Experience. They will be referred to in this study as voices A, B, C, D, E, and F, respectively.

[1] Murray, E., and Tiffin, J., "An Analysis of Some Basic Aspects of Effective Speech." *Archives of Speech*, 1, 1933, 61-83.

A sampling of the speech of the radio announcers was recorded during a scheduled radio broadcast. Subject A made a record specifically for this study. These records were played on a phonograph and the sound waves were transmitted through a condenser microphone to a high speed output level recorder which photographed the variations in speech power on sensitized paper.

Two separate analyses were made. First, the content of the speech was analyzed into its grammatical components after the words were assigned to their proper peaks on the film. Second, the curves were measured in decibel[2] values which made it possible to obtain the variations from the average syllabic power expressed in terms of standard deviation. This measure is an expression of the flexibility of intensity.

II. Apparatus and Technique

The intensity curves were obtained from the phonograph recording by means of an apparatus which has been described by Tiffin.[3] In this technique a vacuum tube voltmeter is used as a high speed output level indicator. A photographic record of this indicator is

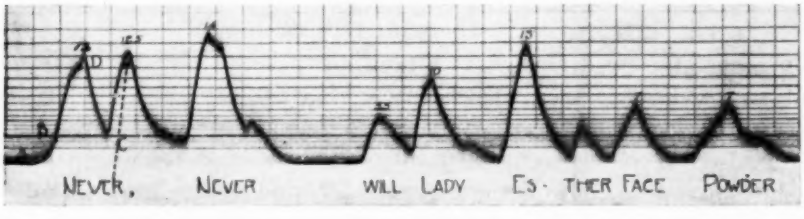


Fig. 1. Section of an intensity graph photographed from the speech of Lady Esther.

obtained by means of a Westinghouse super-sensitive oscillograph element. The effect is such as to permit only major fluctuations of speech power to affect the oscillograph element. The deflections of the oscillograph are photographed on moving film on which decibel lines are automatically traced.

A section of a photograph from the speech of Lady Esther taken with the voltmeter camera is shown in Fig. 1.

[2] A decibel is defined as the difference in power level of two sounds whose intensities are in the ratio of 1.259:1. Its use as a unit of intensity is due to the fact that it approximates the just perceptible difference of intensity.

[3] Tiffin, J., "Phonophotographic Apparatus," *Univ. of Iowa Studies in the Psychol. of Music*, 1, 1932, 118-133.

The maximum value of the power curve reached during each syllable is approximately the same as the syllabic speech power described by Fletcher.[4] A voice might be considered variable or flexible in its use of the loudness or intensity factor to the extent that the maximum excursions of the curve for different syllables spread over a wide range. Thus a measure of the variability of the syllabic power serves as a measure of the flexibility of loudness of the voice.

The horizontal lines on the film are decibel lines, and therefore, are logarithmically spaced. A measure of variability is secured by selecting any one of the decibel lines as an arbitrary base, which in Fig. 1. was the line B, computing the mean value of the syllabic power from this line, and then determining the average deviation of the values from the mean. This value is referred to by Murray and Tiffin[5] as the mean deviation in syllabic power.

The vertical lines on the film indicate time in tenths of a second. A line C is drawn from the highest peak in the wave to the appropriate syllable in the speech content which is written immediately below. The syllabic power is indicated always by the highest peak in the curve for that syllable.

In Fig. 1. the point D represents the peak of the first excursion. This point is separated from the arbitrary base B by twelve lines. Hence, it has been assigned the value of twelve decibels. The necessity of selecting an arbitrary base line becomes apparent when it is revealed that variations in the position and location of the microphone, shifting of the controls on the amplifier, and other factors have a direct bearing upon the recorded intensity wave. By measuring the fluctuations about the mean, it is possible to obtain a measure of variability which is independent of the arbitrary base line and the general level of amplification used in recording.

III. Procedure

A factual article was read by performer A before the condenser microphone which transmitted the sound waves to an aluminum disc phonograph record cutter. While performers B, C, D, E, and F, were performing on the radio, a special circuit made it possible to obtain an aluminum disc phonograph record of their performance. Extreme care was taken to record on days when extraneous noise and volume modulation were absent. A sampling of one to three

[4] Fletcher, H. D. *Speech and Hearing*, New York: D. Van Norstrand, 1929.

[5] Murray and Tiffin, *Op. cit.*

minutes of each performer's speech was recorded. A section of their recorded speech was chosen at random for analysis.

The recorded speeches were played on a phonograph which made it possible for the investigators to write out the speech content. Particular effort was made to obtain an exact reproduction of the speech content.

A condenser microphone in contact with the vacuum tube voltmeter was placed in front of the phonograph. The records of the superior speakers were played and the time-intensity records as described in the preceding section, were obtained. The method of analyzing these records was described also in the preceding section.

A grammatical analysis of the speech content was made. Each record was analyzed so that the various parts of speech were grouped separately. This made it possible to obtain the average decibel power for each part of speech for every speaker.

A study of the variability of intensity was made by computing the arithmetic mean decibel value and then determining the standard deviation of the decibel values from this mean intensity for each speaker.

IV. Results

A. *Grammatical Analysis:*

The grammatical analyses have been summarized in Tables I and II. Table I indicates the mean intensity expressed in decibels for each part of speech and for every speaker. Table II indicates the rank of the relative importance of the principal parts of speech as used by the six superior speakers with intensity as the criterion.

It is interesting to note that Lewis and Tiffin[6] found that "except for one inversion, the voices used more intensity in speaking prepositions and articles as they were placed lower in the scale of merit." Special notice should be taken that these results seem to bear out the fact that the superior speakers in this study used comparatively little intensity when phonating prepositions, articles, and conjunctions.

B. *Flexibility of Intensity:*

The decibel range was computed for each voice. These values are:

Voice A — 20 decibels
B — 22 "
C — 18 "
D — 22 "
E — 18 "
F — 18 "

[6] Lewis, D., and Tiffin, J., "A Psychophysical Analysis of Individual Differences in Speech," *Archives of Speech*, 1, 1933, 43-60.

TABLE I.

THE EIGHT PARTS OF SPEECH AS RANKED IN INTENSITY STRESS FOR EACH SPEAKER AS EXPRESSED IN DECIBELS

Rank	Average	Frequency of Words	Rank	Average	Frequency of Words
	VOICE A			VOICE D	
Adverbs	13.0	6	Adverbs	7.1	7
Nouns	10.4	36	Nouns	4.2	70
Verbs	7.7	17	Adjectives ...	2.8	25
Adjectives ...	7.6	23	Prepositions ..	–1.5	28
Articles	5.1	5	Verbs	–2.3	22
Conjunctions .	4.8	5	Pronouns	–3.5	4
Prepositions ..	3.2	13	Conjunctions .	–4.1	9
Pronouns	3.0	4	Articles	–6.1	32
	VOICE B			VOICE E	
Adverbs	10.6	30	Adverbs	9.2	10
Adjectives ...	8.9	22	Nouns	8.1	42
Verbs	7.4	58	Adjectives ..	7.0	25
Nouns	5.6	52	Conjunctions .	5.9	18
Conjunctions .	5.3	20	Verbs	5.1	26
Pronouns	5.1	56	Pronouns	4.9	14
Prepositions ..	2.6	24	Articles	4.6	21
Articles	1.6	16	Prepositions ..	4.3	20
	VOICE C			VOICE F	
Adverbs	10.8	7	Adverbs	9.2	13
Adjectives ...	9.8	7	Adjectives ...	7.9	28
Verbs	9.1	15	Nouns	7.5	62
Nouns	7.8	36	Verbs	7.2	24
Pronouns ...	5.8	15	Prepositions ..	6.3	26
Articles	5.7	8	Pronouns	5.8	14
Prepositions ..	5.5	16	Conjunctions .	2.3	15
Conjunctions .	4.3	10	Articles	2.1	21

TABLE II.

THE EIGHT PARTS OF SPEECH AS RANKED IN INTENSITY STRESS BY THE SIX SPEAKERS

Parts of Speech	I	II	III	IV	V	VI	VII	VIII
				Frequency				
Adverbs	6	0	0	0	0	0	0	0
Adjectives	0	3	2	1	0	0	0	0
Nouns	0	3	1	2	0	0	0	0
Verbs.	0	0	3	1	2	0	0	0
Pronouns	0	0	0	0	1	4	0	1
Conjunctions	0	0	0	1	1	1	2	1
Prepositions	0	0	0	1	1	0	3	1
Articles	0	0	0	0	1	1	1	3

The standard deviation of syllabic power was then computed for each speaker. The averages for the six performers were:

Voice A — 4.1 decibels
B — 5.5 "
C — 3.4 "
D — 5.9 "
E — 3.5 "
F — 3.7 "
Av. S. D. = 4.35 decibels

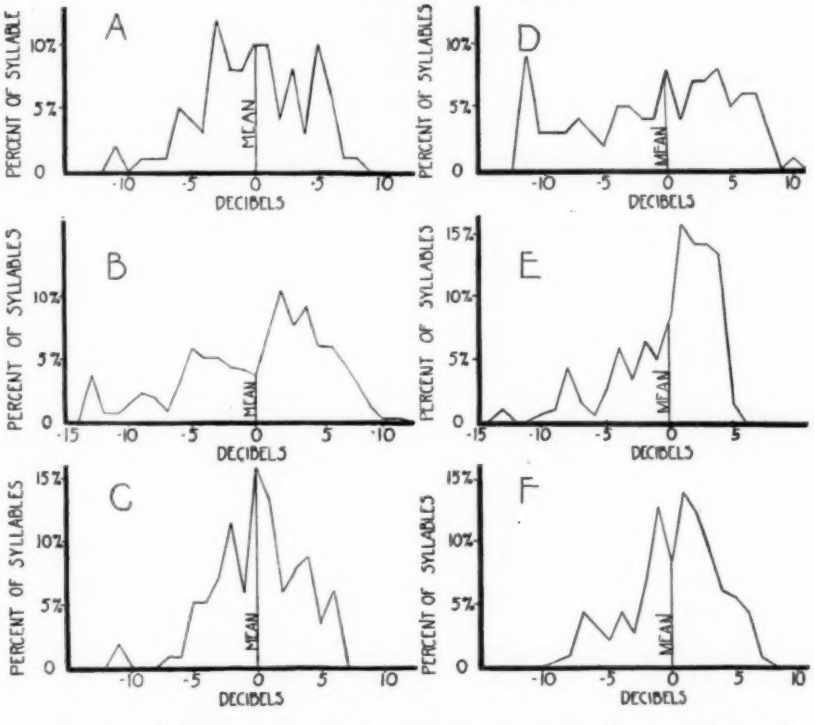


FIG. 2. Distribution showing the variability of syllabic power for the six voices.

The average standard deviation as indicated for the group of superior speakers was 4.35 decibels. Though at first this may seem high, Murray and Tiffin[7] revealed that in "average deviation of syllabic power, or, as it might be called, flexibility of loudness, the difference between the averages of the good and the poor voices is pronounced. There is not, however, a significant difference in this

[7] Murray and Tiffin, *op. cit.*

factor between the average of the good and of the trained voices." The results of this study conform with the findings of those investigators.

The data on the variability of intensity as expressed in decibel range and standard deviation reveal that a significant flexibility of loudness characterizes the speech of superior speakers. These results are in harmony with the findings of Murray and Tiffin.[8]

Summary and Conclusions

Six superior speakers were selected and a sampling of their speech was recorded on a phonograph record. A photographic technique was employed to study the use of intensity by the performers. A grammatical analysis was made of the speech content for every subject. Although limited to the performance of six superior speakers, this study points to the following conclusions:

Grammatical Analysis

1. Adverbs receive the greatest stress using intensity as the criterion.
2. Nouns and adjectives receive a similar amount of intensity and are of next importance to adverbs.
3. Verbs and pronouns receive less intensity than adjectives.
4. Prepositions, conjunctions, and articles receive very little intensity.

Flexibility of Loudness

1. The speakers in this study employed an average range in syllabic power of approximately twenty decibels.
2. Variability of intensity as indicated by the standard deviation is 4.4 decibels for the speech of the subjects in this experiment. If we may consider these performers as superior speakers then these findings are in accordance with Woolbert[9] and others who have pointed out that the superior voice is flexible in intensity.

BIBLIOGRAPHY

Fletcher, H. D. *Speech and Hearing.* New York: D. Van Norstrand, 1929.

Lewis, D., and Tiffin, J. "A psychophysical analysis of individual differences in speech." *Archives of Speech,* 1, 1933, 43-60.

Murray, E., and Tiffin, J. "An analysis of some basic aspects of effective speech." *Archives of Speech,* 1, 1933, 61-83.

Tiffin, J. "Phonophotographic Apparatus." *Univ. of Iowa Studies in the Psychol. of Music,* 1, 1932, 118-133.

Woolbert, C. H. "Effects of Various Modes of Speaking." *J. App. Psychol.,* 4, 1930, 162-185.

[8] Murray and Tiffin, *op. cit.*

[9] Woolbert, C. H., "Effects of Various Modes of Speaking," *J. App. Psychol.,* 4, 1930, 162-185.

THE PSYCHO-PHYSICAL DETERMINANTS OF VOICE QUALITY

CHARLES F. LINDSLEY
Occidental College

I. Introduction

This study was begun with the object of determining thru as many approaches as possible the nature of vocal resonance. These approaches consisted of:

1. Measuring the intensity of vocal cord vibration by means of electrical amplification;
2. Plotting the vibration of bones;
3. The use of sound filters to determine the frequencies essential to vowel quality and intelligibility;
4. Sound photography;
5. The use of kymograph tracings of respiratory movements;
6. The use of a phono-projectoscope; and
7. The use of a mixing panel with which to blend the product of single resonators with the voice.

The following is a summary of some of the more important aspects of this work.

II. Experimental Apparatus and Procedure

The nature of this investigation required an apparatus which would record only the vibrations in the walls of resonance structures and at the same time exclude the actual speech energy released thru the tone passages of mouth and nose. This was achieved thru an electrical stethoscope comprising a small stethoscope connected to a standard condenser transmitter, the latter sound-proofed to exclude everything except the vibrations transmitted by the localizer attached to the stethoscope. These vibrations, of course, had to be amplified, and this was accomplished by means of two amplifiers, a Western

[1] This paper is an abstract of an extended monograph submitted to the Council on Graduate Study and Research at the University of Southern California for the degree of Doctor of Philosophy.

The work was carried out under the supervision of Dr. Milton Metfessel, Chairman of the Department of Psychology.

Grateful acknowledgment is made to the Southern California Telephone Company for the loan of valuable equipment essential to the investigation.

Electric 8-A and 9-A. The recording unit was a General Radio Power Level Indicator graduated to register a maximum of 34 db above reference volume. This was connected to the output of the 9-A amplifier. By means of an in-and-out switch another circuit could be connected to the volume indicator consisting of a second transmitter feeding a two-stage amplifier. This circuit was used in regulating the voice volume from subject to subject.

A set of sound filters was employed in the experiments. These filters were constructed to greatly attenuate frequency bands ranging from 0-200 to 4000-00. In this part of the work the stethoscope was disconnected from the transmitter and the latter removed to a sound proof room from which the subject's voice came back thru a loud speaker to observers in an adjoining room.

These units comprised the major part of the experimental apparatus, but additional data bearing upon the subject investigated included (1) a kymograph, (2) a phono-projectoscope, and (3) an oscillograph.

III. Procedure

Thirty-six subjects were used in these experiments. They included professional singers and teachers, students from speech classes, and others without experience or training in voice tehnique.

Each subject was given practice in humming the sound of "m" and in sustaining the vowels *a, i, u,* with varying degrees of loudness and on different intervals of a pitch scale of one octave. (These frequencies were established by a tuning fork and checked with a beat frequency oscillator.)

When the subject was practiced in vocalizing the desired vowel, the stethoscope was placed at the point from which we desired to measure the vibrations incident to phonation and the reading taken from the power level indicator. In order to make accurate comparisons it was necessary to bring each voice to the same level, and this was done by using a second transmitter which recorded on the V. I. the output of vocal energy.

Care was taken to preserve the constancy of experimental conditions by mechanically regulating the distance of the mouth from the transmitter when establishing the volume of the speaker's voice, by localizing the head of the stethoscope at the same vibration point on each subject, and by checking battery, plate, and filament current readings before each test to assure us that the amount of electrical energy supplied by the amplifiers was at all times the same.

IV. The Problem Re-defined

It was the purpose of this investigation to study the determinants of voice quality. It became apparent, however, that to define clearly all the essential factors involved in voice quality required information which the apparatus at my disposal could not yield. It was not possible (1) to study the precise activity of the vocal cords; (2) to describe the varying changes that take place in the size and shape of or muscular tension in the resonators; (3) to calculate the nature of air vibration within the cavities; or (4) to study the nature and effect of the oral cavity on quality. However, it was possible to measure accurately the amount of vibration in the walls of the voice resonators and to draw conclusions from these quantitative measures relative to certain basic conditions and factors that explain individual voice differences. Thus narrowed, the problem as brought within the experimental limits of the equipment employed may be outlined as follows:

1. What is the nature of laryngeal vibration? Is voice quality determined by the structure and function of the vocal chords?
2. Does voice quality vary according to size and shape of resonators?
3. Is the pharynx the principal resonator?
4. What is the nature of chest vibration; and do these vibrations affect the quality of the tone?
5. What is the nature of the vibration produced in the bones of the face and head?
6. Are the sinuses important resonators particularly for the high frequencies?
7. Does the quality of the tone change when the natural vowel frequencies are attenuated?
8. Is voice quality primarily a function of the vowel, or is it in part determined by vibration produced by the consonants?
9. Is the tone quality called "nasal" caused by a relaxed soft palate with a consequent escape of breath through the nose?
10. Is breath control essential to vocal quality?

The answers to these questions as derived from the data obtained will be briefly summarized in the following sections.

V. Laryngeal Vibration

Our first approach to the general problem was made by measuring the degree of vibration at the larynx. The most satisfactory point

at which to place the stethoscope was at the left wing of the thyroid cartilage.

Vibrations were measured for the three vowels, *a*, *i*, *u*. The data secured in 18 cases is presented in Table I.

TABLE I.

Subject	a	i	u
1	22	24	24
2	20	23	23
3	21	22	23
4	12	18	20
5	18	24	23
6	19	21	23
7	16	19	17
8	16	16	13
9	19	21	23
10	13	18	15
11	12	14	16
12	12	23	25
13	12	20	19
14	9	14	13
15	6	11	12
16	6	12	12
17	6	11	12
18	6	10	8
Arith. mean	13.61	17.83	17.83
Prob. Er.	.85	.76	.82

Comparing the deviations it is found that the deviation for *a* is greater than for *i* or *u*, and that there is less deviation from the average in the *i* series than in any other. That is, there is less variation in the vibration at the larynx when vocalizing *i* than in the case of *a* or *u*. But so slight are the standard deviations that it may be said that each of the vowels produce approximately the same amount of vibration.

VI. Pharyngeal Vibration

The region of the pharynx was carefully measured and charted as one of the supposed important resonators. Owing to the size of the throat cavity and its general proximity to the source of sound, it might be expected that a relatively large amount of vibration would be produced therein. I pursued the same method here as in the study of laryngeal vibration, and recorded the data taken in regard to the vibration produced by the vowels at two points: (1) half-way between the Adam's Apple and the tonsil, and (2) at the back of the throat at the region of the tonsil. (Table VII)

A comparison of the amount of pharyngeal vibration with that produced at the larynx points to the following conclusions:

1. The amount of vibration at the middle of the pharynx is approximately the same as at the larynx.

2. This vibration decreases as we proceed to the back of the pharynx, the second point tested (tonsil position) yielding about 40% as much response for *a* and about 85% as much for *i* and *u*.

3. The vibration produced by each vowel is relatively the same at each point measured.

The probable error and standard deviation are higher for this data, but not enough to invalidate these conclusions.

4. The greatest degree of vibration is registered in the region of the throat.

VII. "Chest Resonance"

A. Nature of Chest Vibration.

The fact that the chest vibrates during speech is easily determined by placing the hand upon the chest during phonation. Is this vibration resonance or forced vibration? And in either case, does it affect the quality or intensity of the tone produced?

The apparatus at my disposal enabled me to determine accurately the fact of chest vibration and also to answer the question as to whether these vibrations were a part of tonal quality.

The initial test was made by requiring the subject to hum the sound of *m* at his maximum vocal energy. It was discovered in the preliminary tests that results varied with the tightness of the teeth, and the final readings were taken when the sound was made with the lips relaxed and lightly touching, and the teeth not tightly compressed. The stethoscope was placed firmly on the arch of Louis, this position being maintained from subject to subject: 27 subjects were tested, fourteen men and thirteen women.

Conclusions

1. There is a wide variation, ranging with men from 24 db to -2 db, and with women, from 16 db to -4db, or in terms of power ratio, the spread of energy for men was 1.51 to -.0038, and for women .239 to -.0024.

2. The distribution of the data secured follows closely a normal distribution curve.

3. The probable error for the average of the cases examined is .9848.

B. Do Chest Vibrations Affect the Quality of the Tone?

A mixing panel was set up and the two sources of sound were blended. The hook-up enabled us to cut off either the microphone into which the subject spoke or the electrical stethoscope. The combined effect of both microphones, that is, the addition of chest and voice, was radically different from the voice alone. In other words, the quality of the tone was strikingly altered when we added to the voice the greatly augmented vibrations of the chest.

The next step was to record the phenomenon observed, and this was done in two ways. First, an electrical transcription was made of three voices. The subject read in his normal voice the first few lines from Edwin Markham's poem, *"Lincoln,* the Man of the People." This was recorded, and then the subject placed a second microphone against his chest and read the same material.

Results

(1) The playback revealed that some voices could be changed for the better. Relatively thin and weak bodied tones were greatly enriched and the quality much improved. In these cases, the changes could also be studied by examining the grooves cut by the recording needle. To the naked eye, these grooves were much wider, showing that radical changes had been produced in the wave form of the voice.

(2) In the case of voices naturally low pitched and resonant, a different quality of tone was produced, but not an improved tone. The playback revealed a thickness that made the tone lose its sharpness and some of its distinctness.

(3) In one particular instance a negative result was obtained. The voice in this (female) was naturally very high pitched, strident, and lacking in resonance. Tests indicated that there was practically no chest vibration, and when the chest microphone was cut in, the tone was altered in quality, but in a manner to make the voice slightly sharper and more metallic.

The second recording of these tonal differences was made by means of an oscillograph. The phrase photographed was "man to match," the picture being cut off with the first consonant of the last word. With the exception of the last sections of these two oscillograms, it is quite clear that the effect of the second chest microphone was to greatly reinforce both the fundamental and overtones in the phrase. This may be interpreted to mean that the chest responds sympathetically to both the fundamental and overtone in the voice, depending upon its natural physical characteristics.

(The same procedure was followed in measuring the effect of amplifying the vibrations of other resonators, or other parts of the body affected by the vibrations of the vocal cords. The stethoscope was applied not only to chest, but under the arm on the fourth rib, the point of the chin, the bridge of the nose and the top of the head. Distinct changes in voice quality were produced in every instance, but I did not find that the product was the same with different voices. That is, while the chest vibrations when amplified in one case produced the most marked change, it was the head, or bridge of the nose, in the second case. Experiments were conducted with ten different subjects.

These tests led to the hypothesis that voice quality can be altered by intensifying the response of one or more of the resonators. The converse principle would be that voice quality is weak or inferior because of the inability of the vocal cord tone to stimulate a proper response in the voice resonators.)

C. The Amount of Chest Resonance in Intoned Vowels.

"Chest resonance" was also studied in relation to intoned vowels. Experiments were made with only three vowels, *a, i, u,* representing the two extremes and the middle position on the vowel triangle. Particular precaution was used here to have each subject intone the vowel at the same energy level and also in the same key.

Table II presents complete data on thirteen cases, men and women.

TABLE II.

Subject	*a*	*i*	*u*	*m*
1	16	17	18	18
2	13	14	12	16
3	10	20	16	14
4	9	8	9	15
5	7	9	10	–4
6	4	10	10	2
7	4	5	6	7
8	4	7	6	4
9	2	–2	5	4
10	2	3	1	8
11	0	8	10	–2
12	–5	0	0	3
13	–8	4	4	0
Mean	4.46	7.92	8.23	6.54
Prob. Er.	1.2	1.1	.95	4.25

Conclusions

1. Intoned vowels produce chest vibrations of marked intensity ranging for the subjects tested as follows:

a 16 to -8 db
i 20 to -2 db
u 18 to -4 db

2. The average chest vibration for *m* is 47% more than for *a*;

the average for *i* is 13% more than for *m*; and the average for *u* is 21% more than for *m*.

3. There is greater vibration for *i* and *u* than for *a*, the average for *i* and *u* being approximately the same.

4. The data show that with the exception of one case (number 9) the numerical relationships are constant. That is, if a subject registers a large amount of vibration on *a*, we will obtain a corresponding record for the other vowels; if chest vibrations are weak for *a*, the record for *i* and *u* will likewise be weak.

5. There is a rank correlation between the vowel resonance and the resonance produced by humming *m*. A person who records a high degree of chest resonance on *m* will also have a corresponding high degree of resonance on the vowels.

VIII. Bone Vibration

Do the bones of the face and head act as resonators? Stanley, who places the entire amount of resonance in the pharyngeal cavities, speaks ironically about the matter of bone resonance, as follows: "One naive writer even claimed that he had 'resonant bones'—whatever this may mean." And again: "—the inference that . . . resonance must be in the head . . . is not only a vague statement, but also an absurd one, since the head would imply the brain cavity."

The facts of bone vibration were easily determined by the apparatus used in these experiments. Table III presents the amount of head vibration produced by each of 16 different subjects humming the sound of *m*. The fact that some of these subjects could record as much as 22, 23, or 24 db is, I believe, a significant fact. This is a very large amount of energy—more than one watt of electrical input. Only one of the sixteen subjects registered less than zero level.

Very limited data were taken concerning the vibration of the head (center of skull) during the phonation of vowels, but enough to indicate that these sounds do produce a marked vibration in the structure of the skull. The following conclusions seem warranted by the few tests made with vowels sustained through the range of one octave:

1. The *a* produces less vibration than either *i* or *u*.
2. The average for the latter two vowels will approximate the average for laryngeal vibration.
3. The lower frequencies produce the greatest amount of head vibration, the amount of vibration decreasing as the frequency increases.

TABLE III.

RECORD OF VIBRATIONS AT THE TOP OF THE HEAD PRODUCED BY 16 SUBJECTS HUMMING THE SOUND OF *M* AT APPROXIMATELY MIDDLE C.

Subject	db
1	22
2	12
3	23
4	5
5	14
6	13
7	21
8	–4
9	10
10	6
11	13
12	16
13	5
14	1
15	14
16	24
Mean	12.2
Prob. Er.	1.3

More complete data are available on the vibration of the jaw. The first part of the jaw to be examined was the point of the chin, and the vibrations at this point were compared to those produced at the hinge of the jaw. In general a graph of the results is basically similar to the curves plotted for the head and chest, except for the fact that the peak is reached not on the G or A below middle C but on the corresponding frequency above 256 dv. The average vibration for each of the vowels used at the point of the chin and at the hinge of the jaw are as follows:

	a	*i*	*u*
Point of Chin . . .	7.66	18.25	17.73
Hinge of Jaw . . .	-2.5	8.62	6.75

The proportionate amount of vibration vowel for vowel is the same. The intensity of vibration diminishes as we approach the hinge of the jaw.

Even more exhaustive data were recorded on the amount of vibration produced at the bridge of the nose. The conclusions derived therefrom are as follows:

1. There is much less vibration produced in the bony structure of the nose when vocalizing the vowel *a* than either of the other sounds used in the experiment.

2. The greatest degree of vibration is produced by the sound *i*.
3. The vowel *u* produces about 40% as much vibration as *i*.
4. In terms of electrical units the relative degrees of energy produced by the three vowels are, respectively: *a*— .0034; *i*— .0160; *u*— .0136. In other words the *i* produced approximately 4.5 times the amount of energy produced by *a*, and *u* produces almost four times the amount of *a*. The *i* produces 1.2 times the energy aroused by *u*.
5. The mean for men is considerably higher than for women:

Mean for men	-4.6	2.9	1.7
Mean for women . . .	3.7	7.2	6.9

IX. Head Resonance

In the literature of voice science one encounters a great deal about "head tones," by which is meant that the voice depends for its resonance upon the upper cavities of the head and face. Particularly are the sinuses supposed by some to amplify the high frequencies.

I undertook to test these theories by measuring the amount of vibration in the sinus walls and comparing the results with those obtained at other points of the resonating mechanism of the voice. A group of professional singers were subjected to a set of tests. Table IV presents the results secured under the following conditions. Each of the three singers (dramatic soprano of heavy voice quality, one of lighter quality, and one of still lighter quality—a lyric soprano) sang with maximum intensity at the high frequency of high A, the vowel *a*. The first recording was taken from the larynx and used as a reference point for purpose of comparison. Then, in turn, the chest and top of head vibrations were recorded, followed by the vibrations of the sinuses and the nasal framework. These data are shown graphically in Figure 1. Table V is a record of the same three singers plus a fourth (mezzo-soprano) humming *m* through one octave.

The following observations seem permissible in regard to these data:

1. The greatest amount of vibration for the vowels occurred at the larynx. (The amount of laryngeal vibration was less at this frequency than at lower frequencies. For the notes G, A, B, and C above middle C the laryngeal vibrations for subject Number 1 were respectively, 20, 15, 21, 26 and for Subject Number 2 were 11, 11, 10, and 13.) This would support the known fact that the amplitude of the cords is less for higher notes.

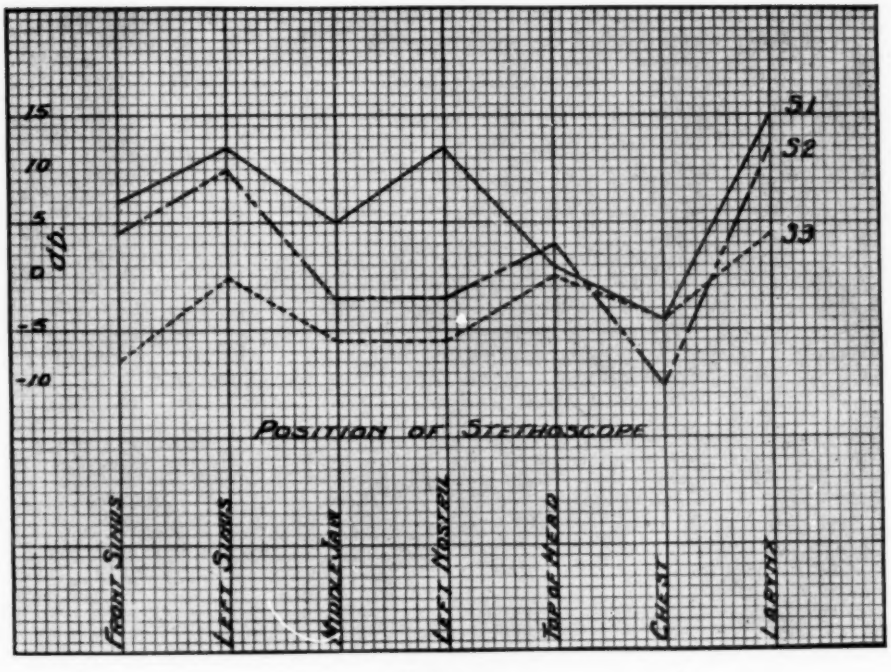


FIGURE 1.
Showing amount of vibration produced at 7 points by each of 3 sopranos singing high A.

TABLE IV.

Position of Stethoscope	Subject 1	Subject 2	Subject 3
Larynx	15	4	12
Chest	–4	–4	–10
Top of head	1	0	2
Front sinus	7	–8	4
Left sinus	12	–1	10
Left side nose	12	–6	–2

2. There was more vibration at the top of the head than in the chest, the difference corresponding for subjects one and two, but not for three.

3. For cases 2 and 3 there was marked sinus resonance. The amount of left sinus vibration was greater than for the front sinus. This may be interpreted, however, only as a strong indication of what we might find with extended examination of many cases, because of the negative result with Subject 2.

4. The amount of nasal resonance varied greatly, ranging from 12 db to –6 db.

5. The amount of resonance produced in the sinuses by humming is comparatively small.

A. *Tenor and Bass Compared*

A careful comparison was made with two professional singers, one a tenor and the other a bass. Measurements were taken at the

TABLE V.

RECORD OF SINUS VIBRATION OF FOUR SINGERS HUMMING THE SOUND OF *M* THROUGH ONE OCTAVE.

Dramatic Soprano (1)	Dramatic Soprano (2)	Lyric Soprano	Mezzo Soprano
–3	–12	–3	–10
–6	–11	1	–10
–8	–11	–6	–10
0	–11	–8	–2
2	–11	–10	–8
0	–11	–8	–10
–3	–11	–11	–10
–3	–11	–11	–10

pharynx, the left sinus, the chest and the top of the head. Each sang, *forte*, the vowels through a scale of one octave, the tenor singing one octave above the bass. The following is the table of recordings:

TABLE VI.

THE PHARYNX—*Half way point on throat.*

Tenor			Bass		
a	*i*	*u*	*a*	*i*	*u*
18	16	20	18	18	19
20	17	18	19	20	21
22	10	12	18	18	20
18	10	12	19	18	21
22	12	9	19	17	21
20	13	11	20	20	22
16	11	17	23	23	25
20	21	22	25	25	25

LEFT SINUS

a	i	u	a	i	u
5	2	8	2	1	–3
8	6	2	2	–1	–4
8	6	10	3	–3	–5
6	8	10	2	0	1
2	2	2	5	4	3
0	3	–1	1	0	–1
3	–2	–2	0	–3	–3

TABLE VI. (CONT.)

CHEST

a	*i*	*u*	*a*	*i*	*u*
6	12	6	15	14	16
10	14	6	14	15	17
6	18	15	16	19	18
8	14	17	16	19	18
2	4	4	15	16	16
0	3	3	14	14	16
0	3	3	14	12	11
0	3	3	15	12	12

TOP OF HEAD

a	*i*	*u*	*a*	*i*	*u*
8	17	11	16	19	15
8	19	16	17	21	16
5	11	8	13	19	14
5	5	6	11	18	13
5	5	5	6	15	10
5	5	6	6	14	8
6	10	8	6	16	10
8	12	10	6	13	14

As an interesting contrast, the vibrations incident to falsetto tones were studied with the tenor. The results are shown in Table VII.

TABLE VII.

RECORD OF VIBRATIONS WITH FALSETTO TONES INTONING THE VOWELS A, I, U.

	a	*i*	*u*
Trachea	25	20	22
Left Larynx	20	26	27
Left Sinus	–6	5	–3
Bridge of Nose	–11	2	2
Chest	8	8	6
Occipital Lobe	–12	–2	–2

If the conventional theories concerning head resonance and the function of the sinuses are true, it would be logical to expect falsetto tones to incite the greatest response in the small resonators. The tenor who served as a subject was able to sing and sustain beautiful falsetto tones and I had a very good opportunity to measure the relative amounts of vibration produced thereby. Table VII presents the results. It will be observed that the actual amount of vibration measurable at the point of the sinus was very small, particularly for *a* and *u*, and that the amount of chest vibration was correspondingly large, approximately the same as produced by the first four tones

in his natural singing range. The maximum intensity of vibration was recorded at the point of the larynx and the trachea.

Figure 2 presents an individual graph for each set of data in Table VI.

The following summarization may be made from these data:

1. *Pharynx*

The intensity of vibration increases in general with the scale for bass.

The total amount of vibration is greater for bass on *i* and *u* (110 to 159) (121-174). For *a* the total is about the same (156 to 160), but for tenor there are peaks. There is no correlation (note by note) for either curve.

2. *Left Sinus*

There is greater resonance for tenor throughout: (32 to 15) (25 to –2) (29 to –16).

There is more uniformity of the curve for bass. The peak coincides with middle C.

Intensity of vibration falls off for the tenor on *a*. There is a single peak for *i* and a triple peak for *a*.

3. *Chest*

Total resonance is greater for the bass (32 to 119; 71 to 121; 57 to 124).

The graph for the tenor shows two peaks for *a* on the notes G and B, and a single peak for *i* on the note A, with a subsequent falling off.

The graph for *u* gives a single peak for the note B, then sharply falls off.

The comparative graphs for the chest show a more uniform distribution of vibration throughout the scale for the bass than for the tenor, particularly at the end of the octave.

4. *Head*

The total resonance for the bass is greater (50 to 81; 84 to 135; 69 to 100).

The graphs for head vibration show a dissimilarity in the amount of head vibration, increases at the end of the scale for the bass, but falls off for the tenor, except in the case of *u*.

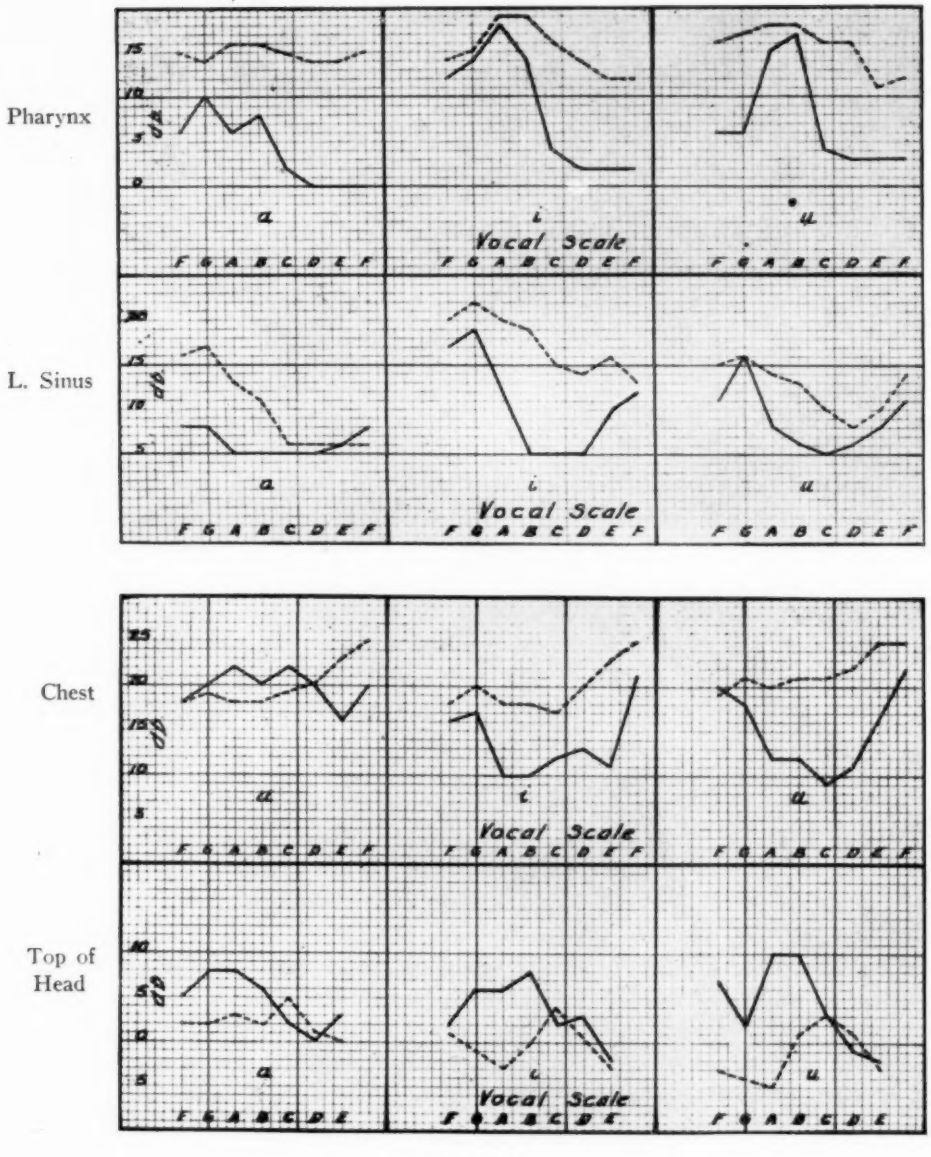


FIGURE 2.
Comparison of amount of vibration at points noted produced by tenor and bass singing the vowels a, i, u, through one octave.
———— Tenor
— — — — — Bass

Conclusion

It may be concluded from the data given by these two subjects that:

1. A given resonator in different subjects does not necessarily respond alike to the same set of vowel frequencies.
2. Large resonators (e.g. the head and chest) respond to low frequencies rather than high, and small resonators (e.g. sinus) respond to high frequencies. This is not true with falsetto.

X. Resonance Measured from Pure Tone Introduced Into the Mouth

The next approach to the problem of voice resonance was made by introducing a pure tone into the mouth and measuring the response of the various resonators. A pure tone was considered a more adequate experimental control because of the presence of partials in the vocal cord tone.

The apparatus employed here consisted of a vibrator taken from a dynamic speaker such as used in theatres and public address systems, a beat frequency oscillator (Type 413-B, Serial No. 364, General Radio Company,) and necessary amplifiers. A hard rubber tube two and three-quarters inches long and one-half inch in diameter was connected to the vibrator, and the tone introduced into the mouth of the subject.

With the electrical stethoscope we picked up the vibrations produced in the walls of the various resonators. We were not concerned so much with individual differences as with the single question: Do resonators have natural frequencies, and what is the strength of the tone added by each resonator. Volume indicator readings were taken from the left sinus, front sinus, bridge of the nose, middle of the left jaw, and the top of the head. The frequencies employed ranged from 60 to 1000 cycles. It should be observed that in this experiment the volume introduced into the mouth was much greater than that produced in ordinary speech, and that the range of frequencies covered a much greater span.

The statistical summary of this work is omitted from this abstract but is presented graphically in Figures 3, 4, 5, 6, 7. The graphs indicate the results obtained with two voices selected because of their dissimilarity. One would be described as thin and high pitched and the other as rich, full and resonant with a characteristic low frequency base.

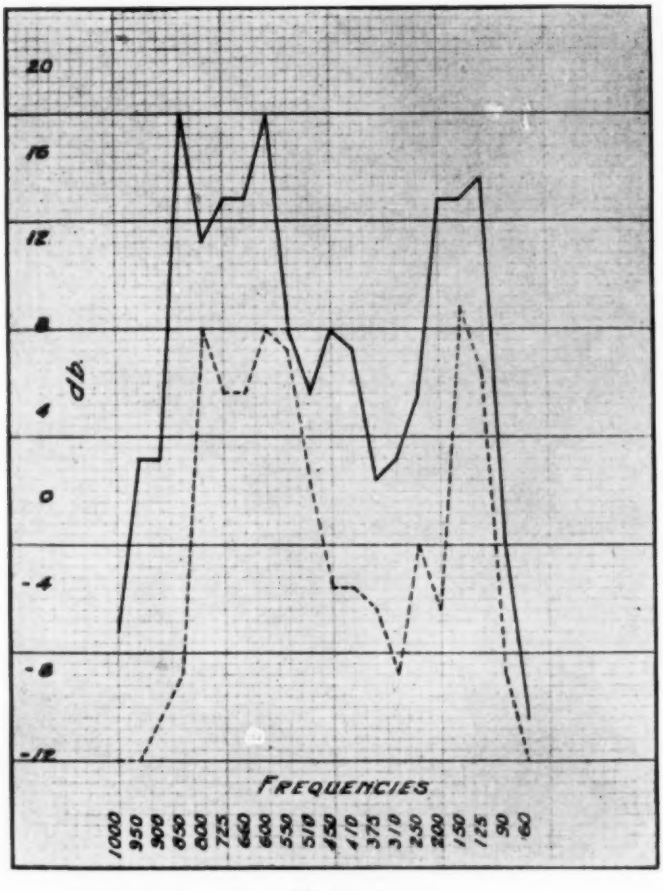


FIGURE 3.
Comparative amount of vibration produced in the walls of the left sinus by pure tone introduced into the mouth. The tone covered a range of from 60 to 1000 cycles.
———— Subject 1
— — — — — Subject 2

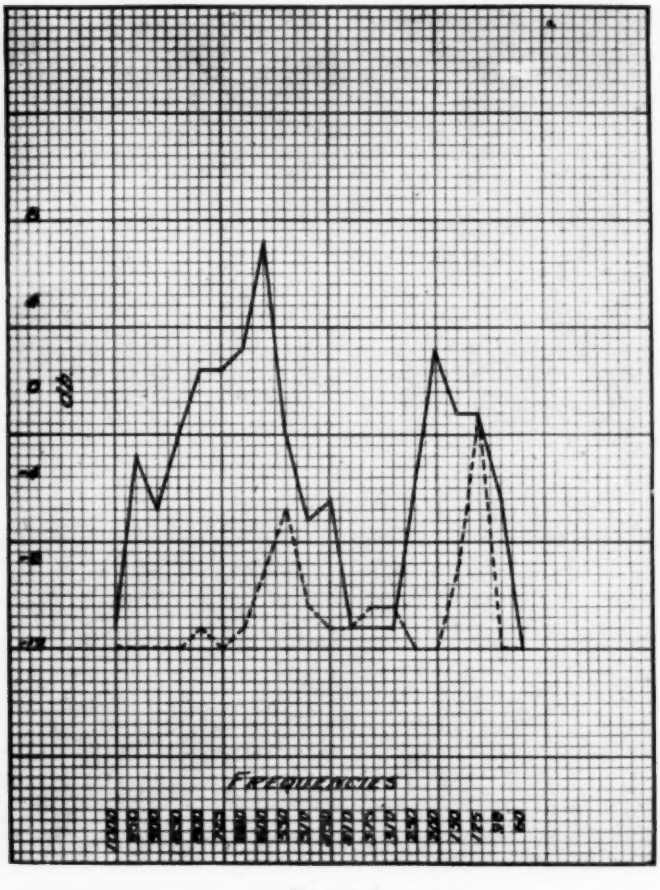


FIGURE 4.
Comparative amount of vibration produced in the walls of the front sinus by pure tone introduced into the mouth. The tone covered a range of from 60 to 1000 cycles.
———— Subject 1
— — — — — Subject 2

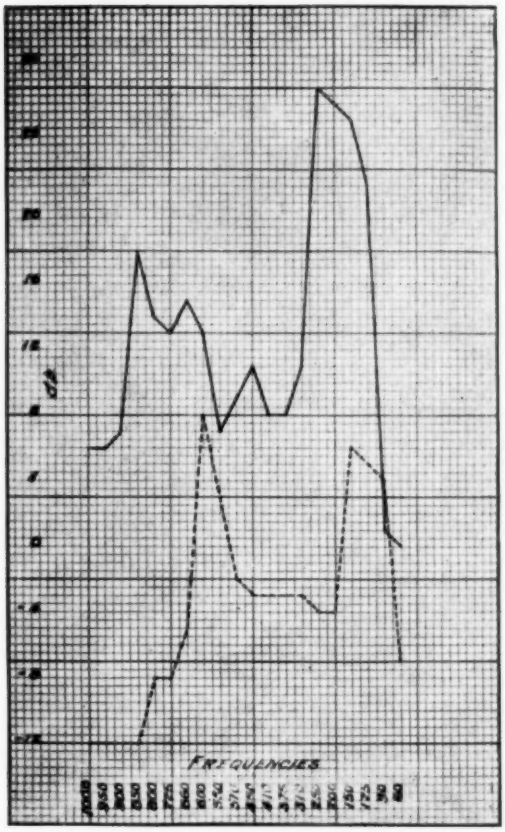


FIGURE 5.
Comparative amount of vibration produced at the bridge of the nose by pure tone introduced into the mouth. The tone covered a range of from 60 to 1000 cycles.
———— Subject 1
— — — — — Subject 2

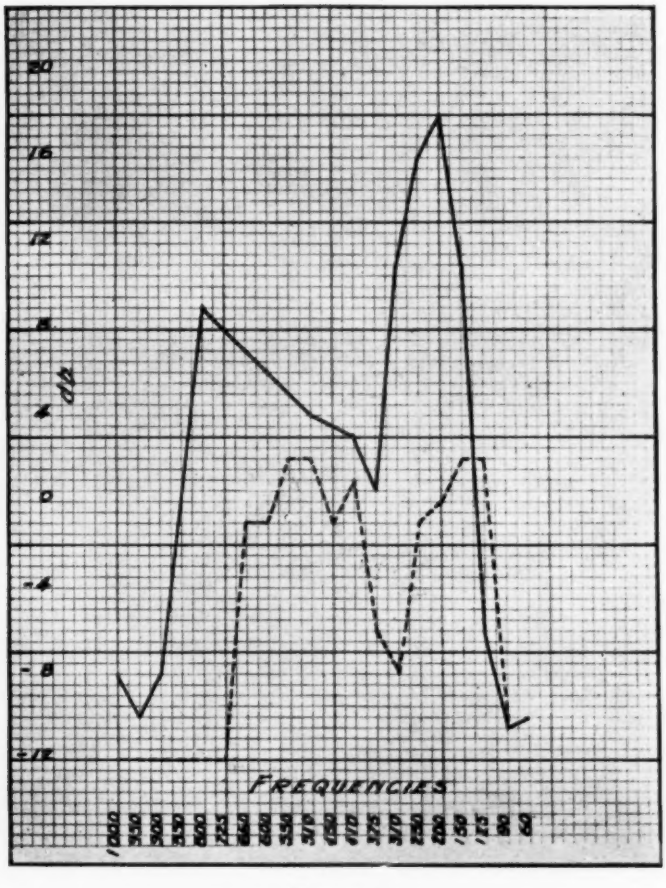


FIGURE 6.
Comparative amount of vibration produced at the middle of left jaw by pure tone introduced into the mouth. The tone covered a range of from 60 to 1000 cycles.
———————— Subject 1
— — — — — Subject 2

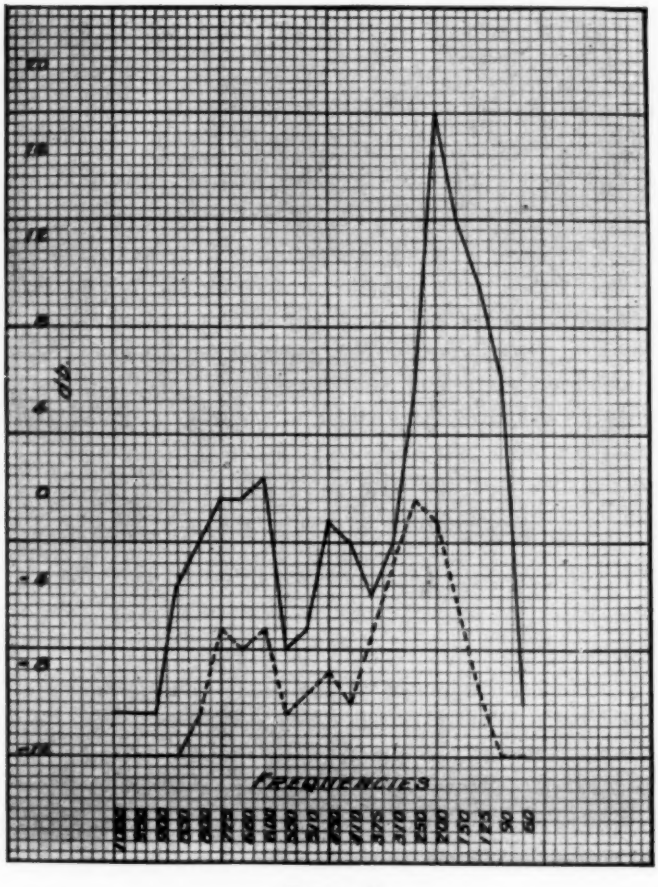


FIGURE 7.
Comparative amount of vibration produced at the top of the head by pure tone introduced into the mouth. The tone covered a range of from 60 to 1000 cycles.
———— Subject 1
— — — — — Subject 2

Conclusions

1. The above graphs reveal a striking similarity between the response of the resonators in the two voices, although

2. The amplitude for one voice, it will be observed, is much greater than that of the other.

3. The tones introduced into the mouth run through a range of five octaves. The curves show peaks corresponding roughly to the octaves covered.

4. For the top of the head, the bridge of the nose, and the middle of the jaw, the maximum response is in the lower registers, and for the sinuses, the greatest amplitudes are for the high frequencies—an octave to an octave and a half above 256 dv.

5. These records verify the conclusions drawn in regard to the resonance characteristic of the speaking voice, namely, that at corresponding points of two octaves we get a similar response.

6. These graphs also verify studies made with tenor and bass voices, which revealed that only the high pitched notes of the tenor produced a measurable response in the sinuses.

XI. Relation of Vowel Frequencies to Quality and Intelligibility

Is voice quality a function of the ability of various resonance structures to select and amplify various frequencies present in the cord tone? Do the supra-glottal cavities act as so many automatic sound filters, altering the character of the tone quality by their ability to assume various size and shape?

We had available for this part of the work a set of low-pass and high-pass sound filters by which we could greatly attenuate various sections of the sound spectrum as follows (each band listed is the band that was passed by the filters, that is, heard by the subjects involved in the experiment):

0-200	0-2000	1000-0
0-400	0-3000	800-0
0-800	0-4000	400-0
0-1000	3000-0	200-0
	2000-0	

Procedure

A small room removed from the location of the filters was padded with blankets, and a celotex platform built for the subject. In an

adjoining room was placed the loud speaker and the group of observers. The average distance of each observer from the loud speaker was 15 feet.

The nature of the experiment was explained to the observers and the effect of the filters demonstrated by eliminating various bands while the subject was reading from a book. It was pointed out how the elimination of the high frequencies made the voice thin and metallic, and how the elimination of the low frequencies made the voice less distinct. Then it was explained that we wished to study the effect upon the quality of the vowel and also its intelligibility. When another vowel or sound was heard the observer was asked to make the correct notation on his paper, and in regard to the changes in quality he was asked to record O, N, S, M, or G, meaning respectively, I hear no sound; there is no change in the vowel spoken by the subject; there is a slight change; moderate change; or great change.

The bands were not passed in the same order, but the experimenter followed a different order of presentation for each subject.

Summary of Conclusions

A large mass of data was secured from this procedure which confirmed the belief that there are in the voice mechanical filters which operate to produce various tonal qualities which are usually described by such impressionistic terms as: mellow, metallic, dull, sharp, nasal, etc.

Specific conclusions concerning the effect of eliminating or attenuating each of the above frequency bonds from the voice as follows:

Men

1. The band 0-200 does not supply enough energy to make any sound intelligible.
2. Attenuating the voice at 800 changes the character of the vowel to *m, o, u.*
3. Attenuating the voice at 1000 (that is, by adding 200 vibrations) the vowel approximates natural audibility, although a recognizable change approaching *u* or *ɔ* is still heard.
4. When everything above 2000 is present there is no change in the vowel.
5. Suppressing frequencies below 2000 produces a character change in the vowel (*i*) and also a change in quality.

6. Suppressing frequencies below 1000 produces a less positive change, but reports varying from slight to moderate were noted, with character changes designated as *ɔɛ* and *a*. Nasality was also present in the quality of the vowel.

7. Adding 200 vibrations (passing the band 800-00) tended to bring the vowel into clear focus, but a slight nasal quality was observed.

8. Eliminating all below 400 produced no change.

Women

These same conclusions apply to the women's voices with only slight variation. (1) In the frequency band 0-1000 the *a* approximated more closely the vowel as spoken, tending to *ɔ* rather than *u*. (2) In the bands 3000-00 and 2000-00 the *a* was heard as *i* but with more distinct quality changes. (3) In the 400-00 band the vowel heard approximated more closely the vowel spoken, though there was slight difference between the observations.

Comparison of Men and Women Speaking Vowel I

Individual judgements did not agree so well in regard to what happened when the various frequencies were eliminated during the phonation of the vowel *i*.

1. Nothing was heard in the band 0-200.

2. Great changes in vowel character were heard at 0-400.

3. The vowel began to approximate the correct sound at 0-2000, but still had the character of *u*.

4. At 0-300 and 0-2000 the vowel was distinct, but the men were more distinct in the 0-3000 band than the women.

5. Suppressing the frequencies below 3000 and 2000 left the observers in doubt, and a wide range of opinion resulted in judging the women in both bands, and the same doubt existed in judging the men in the 3000-00 band.

6. The bands 2000-00 and 1000-00 produced a throaty quality in the male voices.

7. The vowel became clearer in the last three bands. There was still a spread of opinion at 800-00 for men, and also at 400-00. The women were heard distinctly in the last two bands.

Comparison of Men and Women Speaking Vowel U

The graph of changes occurring in the vowel *u* spoken by men and women shows marked similarity in the effect upon the two

voices of eliminating various frequency bands.

1. In the band 0-200, some observers could hear a sound that approximated *o*, and others could hear nothing.
2. The *o* was clearly audible in the 0-400 band as *m*.
3. No changes were noted throughout the range 800-4000.
4. Cutting out frequencies below 3000 eliminated any sound. The *u* was inaudible.
5. The same effect was produced when frequencies below 2000 were suppressed, although some observers heard the sound of *i*.
6. The *i* became clear to all in the zones 1000-00 and 800-00.
7. Adding everything above 400, or, in other words, eliminating frequencies below 400, still distorted the vowel. It was now heard as *a*.
8. The *u* was distinct as 200-00.

XII. Relative Amount of Resonance Produced by the Consonants

Is there any resonance or forced vibration in the walls of the various resonators that accompanies the voiced consonants? Speech is a continuous process of rapidly alternating vowels *and* consonants, a succession of continuants and stops. *Does voice vibration cease during the stops?* This question is of importance because if quality is a complex of sound vibration then all vibration must be taken into account. *The answer is that a very large amount of vibration is produced in the walls of the resonators by the consonants of ordinary conversational speech.* The explanation of this fact is that although the stopped consonants are voiced, and although the vocal sound is interrupted or very much subdued, the consonants continue to sound in a subdued way until the stop is removed and the vowel begins to sound. In other words, the consonants are perhaps to be studied not only for the articulative purpose of rendering speech distinct, but also for the contribution they may make to quality and intensity.

Tests were made with different subjects, and "consonant resonance" measured at various points: point of jaw, left sinus, front sinus, top of head, bridge of nose. The tests were made in this manner: The subject was asked to speak the consonantal element by itself and then the consonant was added to a vowel. The vowel added to the consonant was selected because it, when spoken alone, failed to produce but a small amount of energy. This indicated

that the high degree of vibration registered by the volume indicator was from the consonant and not from the vowel. The subject would speak the syllable selected in an ordinary, but firm tone of voice, and the reading then would be set down on the recording sheet.

Two tables VIII and IX are submitted to indicate the results obtained, one for the left sinus, and the other for the point of the chin or jaw.

Conclusions

I consider that this experiment suggests a very important point regarding the practical side of teaching speech; namely, that a definite attack of consonants adds not only distinctness to speech, but it stimulates a response in the walls of the resonators, adding forced vibrations that must prove a factor in both the quality and the intensity of the speech stream. It was of particular interest that the professional singers produced the least amount of what I choose to call "consonant resonance," and the radio announcers, the greatest amount. Fletcher (136) comments on the fact that singers in general lack distinctness because they are trained primarily to manipulate a melodic stream; that is, the vowels; and that in this process consonants are necessarily slighted. Sustained stress necessary in singing is secured by prolonging vowel time, whereas in the broken stress of speech the consonants are more prominent.

XIII. Results Obtained in a Study of Voice Resonance by Using a Phono-Projectoscope

An approach was made to the study of nasality (so often referred to as produced by the escape of breath through the nose by a lowering of the soft palate) by means of a phono-projectoscope. This apparatus comprised a phoneloscope which when actuated by sound waves projects the latter on a moving screen produced by a revolving drum on which is set 16 white shutters propelled by an electric motor.

The object of this study was to determine two sets of facts:

1. First, students were taken individually and asked to speak given words, sounds, and sentences into the receiving end of the apparatus, in order that we might answer the following questions: (1) How much escape of breath is there in the vocalization of primary vowels? (2) Is there a freer escape of breath from one nostril than the other on both the vowels and on the nasals *m* and *n*?

(3) In speaking a sentence employing no nasal sounds, is there a noticeable amount of breath escape from the nose?

2. When students are paired so there is an easily recognized difference in voice quality, is it possible to measure by means of the projectoscope resonance differences which may explain the difference in the character of the two voices?

The procedure in the above experiments was as follows: Students

TABLE VIII.

CONSONANT RESONANCE AT THE LEFT SINUS—10 SUBJECTS.

Case	*d*	*f*	*g*	*i*	*b*	*l*
1	18	18	19	17	14	8
2	12	12	12	12		
3	6	6	6	0	8	6
4	2	4	2	0	0	2
5	–8	–8	–8	–8	–8	–8
6	–4	0	0	0	0	0
7	20	20	16			25
8	–4	–8	–10	–11	–2	–11
9	12	2	1		–4	0
10	0	–2	–2		–2	0
			(8 cs.)	(8 cs.)	(8 cs.)	(9 cs.)
Ar. M.	6.6	4.4	3.6	1.25	1.75	2.75
P. E.	1.99	2.077	1.8352	2.0655	1.7309	2.4552
S. D.	9.3316	9.757	8.6045	8.672	6.3587	10.2983
Coef V.	141.3%	221.7%	239%	693.7%	363.3%	374.4%
Sk	.86	.14	.069	.144	.51	.26
Geom. M.	3.114	2.7673	2.5482	1.4183	1.2142	2.0718
	m	*n*	*r*	*s*	*v*	*z*
1	12	12	14	16	17	1
2	18	15	–6	–6		
3	10	10	4	10	10	10
4	6	10	4	–2	–2	–6
5	5	4	–4	–4	–4	0
6	4	4	4	4	6	6
7	16	18	11	20		
8	4	–4			2	
9	1	1	0	2	–2	2
10						–2
	(9 cs.)	(8 cs.)	(8 cs.)	(8 cs.)	(7 cs.)	(7 cs.)
Ar. M.	7.55	7.77	.625	5.0	3.85	1.57
P. E.	1.5068	1.494	1.6997	2.0505	1.6323	1.2276
S D	6.702	6.6463	7.1441	8.6023	6.4203	4.836
Coef Var.	88.7%	85.5%	1141.%	152%	166.7%	308%
Sk	.52	.507	–.47	.58	.91	–.29
Geom. M.	4.91	5.0331	1.515	2.4332	1.6453	1.563

TABLE IX.

CONSONANT RESONANCE AT THE JAW—11 SUBJECTS.

Case	*d*	ð	*g*	*j*	*b*	*l*
1	18	18	19	17	14	8
2	23	23	23	23	18	24
3	20	22	22	24	20	22
4	22	22	16	25	18	20
5	16	16	16	16	13	17
6	0	8	6	10	0	10
7	16	18	14	17	10	8
8	26	26	26	26		26
9	20	12	16	11	2	–4
10	18	8	22	10	10	4
11	16	17	18		14	
				(10 cs.)	(10 cs.)	(10 cs.)
Ar. M.	17.72	17.27	18.0	17.9	11.9	13.5
P. E.	1.295	1.1534	1.0455	1.268	–1.3422	1.9763
S D	6.3831	5.6902	5.169	5.974	6.3	9.287
Coef V	36.02%	32.92%	28.72%	33.3%	52.9%	68.79%
Sk	.26	–.303	.387	–1.021	–.412	.59
Geom. M.	15.412	16.157	16.919	16.831	9.8575	9.2882
	m	*n*	*r*	*z*	*v*	*v*
1	12	12	14	16	17	17
2	26	26	26	27	27	28
3	24	24	20	23	21	22
4	22	24	24	20	23	21
5	18	20	16	24	16	20
6	12	12	10	18	16	16
7	14	16	14	18	12	16
8	26	26		24		
9	2	2	0			20
10	6	6	12	14	18	12
11					18	16
	(10 cs.)	(10 cs.)	(9 cs.)	(9 cs.)	(9 cs.)	(10 cs.)
Ar. M.	16.0	16.8	15.11	20.44	18.66	18.8
P E	1.693	1.7334	1.657	.9199	.9361	.8903
S D	7.9497	8.1583	7.3702	4.0914	4.1637	4.1904
Coef V	49.68%	48.56%	48.77%	20.01%	22.38%	22.29%
Sk		–.88	.664	–.74	.384	.668
Geom. M.	13.0025	14.233	12.555	20.03	18.214	18.347

were taken at random from classes in speech, and each in turn was directed to perform as follows:

(1) Cup the hand around the tube, put your mouth close to the funnel thus made, and sustain in a normal but firm speaking voice, the phonetic vowels, *i*, *ɛ*, *ɑ*, *o*, *u*.

(2) Put the tube lightly against the opening of the right nostril, and hum the sound of *n*. Do the same for the left.

(3) Put the tube on each nostril in the same way and speak firmly the sentence, "Peter Piper picked a peck of pickled peppers."

In the second part of the investigation students were selected by the instructor in pairs. He tried to select easily recognized differences in voice quality. These students were examined more carefully and at greater length in the following manner. Both students were seated closely together so that they could speak alternately into the receiver. They were directed to:

(1) Give each of the vowels used above, holding the tube to the lips.

(2) The same group of vowels were next spoken with the tube first against the right and then against the left nostril.

(3) The nasal *n* was next hummed and the observation recorded.

(4) Peter Piper sentence was used, taking the reading from the nose.

(5) Last, each student recited, holding the tube to each nostril in turn, the lines:

"When the Norn Mother saw the whirlwind hour,
Greatening and darkening as it hurried on,
She left the Heaven of Heroes and came down
To make a man to meet the mortal need."

(This quotation was used because of the preponderance of nasal sounds.)

These students had been given a rating at the beginning of the experiment, the good voice being rated "x" and the other "-". Then at the end of each vocalization recorded on the drum of the projectoscope, the experimenter made a notation of "x" or "-" according to whether the amplitude of the "x" voice was greater or less than the "-" voice.

Conclusions

The conclusions to be drawn from the first part of the investigation may be stated as follows:

1. Few students are free from escape of breath from the nostrils when pronouncing in sustained tone the vowels *i, ɛ, əe, o, u.*

2. The vowel *i* is accompanied by the greatest amount of nasal breath, followed by the vowel *u.*

3. The amount of breath escape from each nostril differs a great deal in more than 50% of the cases examined.

4. The right nostril is more often constricted than the left. (This might be reversed with another group of subjects.)

5. Only one student out of 34 gave a positive reaction to all tests.

XIV. Relation of Breathing and Breath Control to Voice Quality

A great deal of voice training is based on the theory that breath control is the *sine qua non* of effective and artistic vocal expression. In fact the delicate motor co-ordinations of speech are supposed to include precise respiratory movements that constitute the physical basis of voice production. "Pitch, intensity of tone, length of phrase, sustained tone, staccato, flexibility, crescendo, diminuendo, are all the results of varying amounts of breath and of varying degrees of pressure." This belief has led to a prescribed method of breathing, or a system of controlled respiration, called diaphragmatic or central breathing.

I have previously published an exhaustive study of respiratory movements involved in speech and dramatic reading by means of kymograph records, and have demonstrated the relation of breath control to an effective use of the voice. My conclusions apply, however, to phrasing, vocal intensity, and control of voice register, and not to the quality of tone produced.

Is there a relation between breath control and observed differences in voice quality? I selected 25 students from speech classes who in my opinion and the opinion of a teaching colleague possessed the most pleasing voice qualities to be found, and paired them with 25 others who we agreed had very poor quality of voice. These subjects as paired were asked to read at their conversational level the same material (a paragraph from "The Message to Garcia") and a kymograph tracing was made of their upper chest and diaphragmatic breathing. Extreme care was observed to maintain constant conditions of pneumograph tension by use of a manometer and by checking the operation of the apparatus. A mere scansion of these records revealed clearly and emphatically that there was no correlation between the amount or method of breathing and voice quality. It was not necessary to make a millimeter measurement of the tambour arm excursions to ascertain this fact. In some cases the "better voices" showed more diaphragmatic than costal breathing, but in the next test the converse was true, and no safe generalization can be made.

The conclusion compelled by these tests is that the quality of a voice as heard in ordinary speech is not a product of any particular method of breathing.

This is not to be interpreted, however, to mean that public speakers, actors, or singers should disregard any or all prescribed methods relating to breathing; because they may be of value on other counts. Particularly in vigorous or sustained speech effort, proper breath control may prevent muscular constrictions which interfere with proper tone production. My only point is that "breath control" is not a controlling factor in the speech *quality* of normal social conversation.

XV. General Conclusion

In conclusion this work may be summarized for the purposes of this abstract under two heads:

A. A categorical statement of findings.

1. The Voice Amplifying System.
   a. Vocal cord tones produce vibrations throughout a wide area of the chest, throat, face and head.
   b. In general, the most active resonators, according to the amount of vibration measured electrically, are: the pharynx, the lower jaw, the chest, the nasal framework, the left and right sinuses and the frontal sinus.
   c. The trachea.
      (1) There is a considerable amount of vibration produced in the trachea during speech, but the amount does not vary consistently with the pitch as in the case of the other amplifiers.
   d. The principal dead spots are the frontal and occipital bones of the head, the molars or high cheek bones, and the fleshy portions of the cheeks.
2. The Individual Resonators and Their Response.
   a. The larynx.
      (1) The greatest amount of vibration recorded in these experiments was at the point of the left wing of the thyroid cartilage of the larynx. This vibration should be considered as indicating the degree of energy supplied to the voice amplifiers.
      (2) The vowel *a* produces less energy at the cords than does the high frequency vowel *i* or the low frequency *u*.

(3) The same amount of vibration is recorded by the stethoscope when placed just above the Adam's Apple or at the top of the angle of the thyroid cartilage.

b. The pharynx.

(1) The vibrations throughout the area of the throat are almost as strong as those recorded from the larynx.

(2) The intensity of vibration produced by *a* decreases regularly as we proceed from the larynx to the back of the throat. There is only a slight decrease for *i* and *u*.

c. The chest.

(1) Chest vibration accompanies the vowel and consonantal elements of speech.

(2) The amount of chest vibration varies greatly, the extremes for a group of 27 men and women normally distributed (skewness .45) shows a difference range of 396% for men and 99.5% for women.

(3) The vowels *i* and *u* produce more chest vibration than *a* or *m*; *m* produces more vibration than *a*.

(4) The chest resonates principally to low frequencies, but varies with the pitch of the tone, registering the greatest amount for low G, falling off up the scale to E, and building up on the corresponding G of the next octave.

(5) Although there are striking exceptions, the amount of chest vibration is correlated in general with voice quality: a lack of vibration is related to thinness of tonal quality, and its presence is related to orotund quality.

(6) "Chest resonance" is an important factor in voice quality as shown by the fact that the quality of the tone is affected by amplifying the natural vibrations of this resonator.

d. The skull.

(1) The parietal area of the skull registers intense vibrational energy for the consonant *m* and for the vowels.

(2) This amount is greater for men than women.

(3) It is greater for bass and baritone than for tenor voices.

(4) The amount of vibration varies with the frequency of the tone produced.

e. The jaw (inferior maxillary).

(1) The amount of vibration at the point of the chin is greater for *m* and the vowels than at the top of the head and chest.

(2) There is a measurable amount of vibration throughout the entire range of the lower jaw. Measurements taken at the hinge of the jaw when plotted show the same characteristics as for the point of the chin, chest, and head, but the intensity is much less, particularly for the *a*.

(3) The vibration of the lower teeth is almost twice as much as for the upper teeth.

f. The bridge of the nose (juncture of the nasal bones).

(1) The amount of vibration in the nasal bones is comparatively small for the vowels *a, i, u*. It is much greater for the sound *m*.

3. "Head tones."

a. The use of the phrase "head tones" in regard to *speech* does not seem fully justified by this experimental data, for the amount of vibration produced in the sinuses or in the bones comprising the sinuses by the vowels of ordinary speech is negligible.

b. A comparative study of singers indicates that more forced vibrations are produced in the sinuses by tenor and soprano voices than by contralto and bass voices respectively, but there is considerable variation in the data. Moreover, a careful study of the varying degree of vibration at the vocal cords together with a comparison of sinus vibration with the vibration in all the other resonators involved, indicate that other factors must be considered in explaining the quality of high tones.

c. The response of the voice resonators to a pure tone introduced into the mouth did show that the smaller resonators responded to high frequencies, and the larger and heavier bones and cavities to lower frequencies, but the tones used ran through a range of 60 to 1000 cycles, a scale of more than four octaves, whereas the natural voice range for a speaker is less than one octave, and for a singer not more than two.

4. Vibration produced by consonants.
   a. The walls of all the amplifiers studied yield high db readings for consonants, indicating that voice amplification is a continuous process throughout the stream of connected speech.
5. Sound filters.
   a. Both vowel quality and intelligibility are affected by attenuating frequencies in the sound spectrum.
6. Voice quality can be changed by affecting the product of the amplifiers.
   a. Voice quality can be changed either favorably or unfavorably by increasing or decreasing the amount of vibration in one or more of the voice amplifiers.
7. In speaking vowels only one subject out of 34 was able to intone the sound without a measurable escape of breath from the nostrils. There was no observable correlation between this direction of breath and voice quality.
8. There is no relationship between the method of breathing and the quality of the *normal speaking voice.*

B. Interpretation of Above Conclusions.

1. The voice amplification system.

The system of voice amplification may be stated in terms of an electrical analogy: the vocal cords are the oscillator, and the resonating cavities and structures constitute the amplification system and the mixing panel.

The tone is initiated by the cords, but since the structural parts of the amplification system vary greatly in size and shape, it is illogical to assume that the vibrations produced by each note or tone in the scale constitute resonance strictly defined, because we cannot assume that each part has a natural periodicity corresponding to the cord tone. Therefore, these vibrations should be called "forced," and it is these forced vibrations that produce vocal amplification. If forced vibrations act primarily to increase the amplitude of the impressed force (the vocal cord tone), we must conclude that the quality depends on the character of the sounding boards as amplifiers. (This omits consideration of resonance characteristics due to the effect of air vibrations within the cavities.) These sounding boards depend for their effectiveness upon physiological factors of density, size, and shape: some speakers may not have amplifiers

for all frequencies; and if the amplifiers for the high or low frequencies be lacking the quality of the tone will be impaired. It is for this reason that the more flexible voice—the voice with the greatest range of inflection and modulation—gives the impression of better quality, because the more frequencies present in the tones initiated at the vocal cords, the greater the number of sounding boards brought into action and hence the greater amount of vibrational or resonance energy.

The practical importance of these conclusions is that the conditions requisite to good tonal quality are for the most part established by natural physiological endowments, which cannot be changed radically by training. This does not mean that we can do nothing at all to improve the quality of a voice, but it does mean that our efforts in this regard are definitely limited.

What can be done by instruction to establish conditions that will produce better voice quality? To answer this question it is necessary to understand that voice quality as judged by the ear of the hearer is a Gestalt, a configuration of many integrated elements perceived as a whole, such as the vocal register or key, inflectional variety, distinctness of utterance, adequate timing, *et cetera*. These elements may be developed through training, but the actual vibrational energy of the voice is conditioned by the natural construction of the vocal cords and the amplifiers related thereto.

2. The resonators.

These experiments prove conclusively that forced vibrations are produced in the thoracic area, and that these vibrations when amplified beyond their natural resonance strength alter the quality of the tone. Therefore, the quality of an individual voice is in part due to the presence or absence of these forced vibrations. A unique problem would be to ascertain how much of a load the chest as an amplifier could carry without producing distortion. This is suggested by the fact that our work with two microphones and a mixing panel revealed the fact that light voices may be improved by increasing the load, and that heavy voices are muffled by increasing the load. The further pursuance of this experiment should lie in testing other amplifiers in the same way, or in combining the product of two or more resonators.

The fact that the pharynx produces the greatest amount of vibration during speech suggests that this particular amplifier is

probably the most important single voice resonator, although the proximity of the pharynx to the vocal cords may be the entire explanation. However, this conclusion is supported by our knowledge of the fact that the pharynx undergoes greater and more varied change in size and shape than any other cavity in the amplification system, and may therefore operate as a true resonance mechanism.

These experiments also show clearly the extent to which the bones of the face and head conduct sound. These vibrations undoubtedly affect the quality of the tone, but an accurate evaluation of this point could be made only by a correlation of bone measurements, and the quality of a given voice graded according to an accepted norm.

The relatively small amount of vibration produced in the nasal bones by the vowels, and the proportionately large amount of vibration produced by the consonant *m* is related to the theory that pure vowels should be produced by directing the breath entirely through the oral passage; and that a desirable quality on *m, n, ng,* and *l* depends upon the freedom of air vibration within the walls of the nasal passages. The phonoprojectoscope experiments revealed, however, that practically no one is free of nasal vibration in vowel speech, and therefore we would expect some degree of nasal vibration at all times. Attention should be called to the fact that what is very often denominated as nasality is not an over presence of nasal vibration, but is probably the result of constricted pharyngeal action.

3. "Head tones."

This work should contribute to a clarification in our use of such terms as "head tones," "sinus tones," and "chest tones." Merry, by means of X-ray photographs, drew the conclusion that there was a correlation between the size of the sinuses and the quality of the voice, but this work indicates that the amount of vibration produced in the sinuses in ordinary speech is practically negligible. In the case of singers more activity is registered in these areas, but this is explainable on the ground that the tone is much more intense than in speech and that the vibrations are probably forced and not true resonance; and because the sinus areas are very small, it is difficult to see how they could contribute much to the amplitude of the tone. It is natural, of course, for these smaller areas to show some response to high voice frequencies because of their size, but

a more adequate explanation of the tonal quality in the upper register probably lies in an understanding of the activity in the changes produced in the larynx.

4. Sound filters.

Experiments with sound filters demonstrated very clearly the relationship of frequency bands to both vowel quality and intelligibility. It is in these facts that we find the explanation of certain specific voice qualities designated as raspy, gutteral, harsh, and nasal. Reference has been made to the work of Russell, in which he explains how various constrictions of resonance cavities or conditions brought in the walls of these cavities produce natural physiological sound filters that change the quality of the tone. This point again suggests the difficulty of changing the quality of the voice provided the quality is due to obstructions or constrictions, or even pathological factors that cannot be changed.

5. Resonance produced by the consonants.

Teachers instruct students to form their consonants sharply and clearly in order to effect distinctness of utterance. A precise utterance of consonants is, undoubtedly, requisite to this end, and it is a new concept that consonantal attack may be an element of voice quality. I discovered, however, that vigorous consonantal energy is accompanied by very large degrees of vibrational energy throughout the entire amplification system, and I conclude therefore that the strength or intensity of a voice is in part attributable to the manner in which the consonantal elements are formed.

6. Response of resonators to pure tone introduced into the mouth.

The graphs presented to show the response of resonators to a pure tone introduced into the mouth present rather emphatically the resonance characteristics of the amplifiers tested. The smaller resonators such as the sinuses show very marked response to high frequencies as contrasted to the response of the chest and top of the head to low frequencies. The fact that the peaks in these curves correspond approximately to related points of the octaves covered between 60 to 1000 cycles suggests definite resonance properties, but it should be borne in mind, however, that these tones ran through a range of four octaves, and therefore the results are not comparable to the restricted limits of ordinary voice production.

7. Changing the quality of the voice by changing the product of the resonator.

The fact that voice quality can be changed by amplifying the natural vibrations of any particular resonator suggests the possibility of mechanically constructing any desired voice quality through the use of proper instrumental means. This fact has practical application. For our immediate purpose, however, the point illustrates the conclusion outlined in the first paragraph of this section; namely, that in the imperfect voice we have inferior amplifiers—amplifiers that fail to respond to particular frequencies produced by the vocal cords.

8. The relation of breathing to voice quality.

It is a decidedly unorthodox concept to state that breath control is not related to voice quality. It must be understood that by this statement I mean that breath control is not related to normal conversational voice quality, and the term "quality" must be sharply differentiated from intensity, pitch, and time. It is quite obvious that breath is required to sustain a long note or a long phrase or sentence. Likewise, in singing breath control is required to initiate tonal attack in rapidly alternating points on the vocal scale, and furthermore vocal intensity as required for singing or shouting necessitates a sharp attack of the breath stream upon the vocal bands; but these are not the conditions in ordinary speech. The actual amount of breath required for normal speech is very small, and conscious use or regulation of the breath is not necessary, nor is it so employed.

It is not my position, however, that the teacher of practical public speaking should not give attention to breath control, because extended kymograph studies on this subject show conclusively that proficiency in formal public address and dramatic reading is related to proper methods of breathing. Furthermore, proper methods of breathing tend to establish relaxation throughout the tone passage, which will in turn produce a better quality of tone. But in general, as we hear people speak in ordinary social conversation, there is no correlation between diaphragmatic or costal breathing, and so-called "good" voices or "poor" voices.

METABOLIC STUDIES OF STUTTERERS*

I. Biochemical Study of Blood Composition

GEORGE A. KOPP
University of Wisconsin

PREVIOUS studies of stuttering and functional researches on the stutterer present evidence that stuttering is a disturbed body metabolism which is manifested primarily in tonic and clonic oral myospasms.

Investigations of stuttering[1] have proved that stuttering is an affliction of childhood; that the majority of stutterers begin to stutter before starting school; that stuttering increases during the first five grades of school while the number of all other speech defects decreases; that a large number of stutterers have had a period of from four to five years of normal speech; that there are more boys that stutter than girls; that stuttering is often transitory; that the intelligence of the stutterer is normal or above; that stuttering rarely accompanies the known brain afflictions and that it has little or no significance in their symptomatology.

Functional researches by West[2] subsequently confirmed by Travis[3] show quite conclusively that the rate of jaw and brow movements of the stutterer are slower than similar movements of the non-stutterer of the same sex. The stutterer has also been reported different from the non-stutterer in regard to mirror tracing, writing, and other voluntary movements, action currents,[4, 5] vaso-motor changes[6, 7] pulse, and certain galvanic changes.[8] The breathing of

*This investigation was aided in part by a grant from the Wisconsin Alumni Research Foundation.

[1] *Special Education—The Handicapped and the Gifted,* Report of the Committee on Special Classes at White House Conference on Child Health and Protection, The Century Co.

[2] West, Robert, "A Neurological Test for Stutterers," *The Journal of Neurol. and Psychopath.*, X, XXXVIII, 1929, p. 114.

[3] Travis, L. E., *Speech Pathology,* Appleton and Co., 1931.

[4] Technical Papers Presented at the 1932 Convention of the American Society for the Study of Disorders of Speech, Robert West, editor, Madison, Wisconsin.

[5] Travis, *Op. cit.*

[6] Fletcher, J. M., *The Problem of Stuttering,* Longmans, Green and Co., 1928.

[7] Robbins, S. D., *Stammering and Its Treatment,* Boston Stammerers Inst., 1926.

[8] Fletcher, *Op. cit.*

the stutterer has been proved to be abnormal[9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19] and is so accepted.

A few biochemical studies of the stutterer have been made. Starr[20] in 1922 reported a difference in the hydrogen-ion concentration of mixed saliva and in 1928 published his study[21] of alveolar carbon dioxide of the stutterer in which he contends that the stutterer has a high alveolar carbon dioxide, and he postulates that this is due to a relative insensitivity of the respiratory center resulting in an oxygen deficit and probable elaboration of toxins in the blood.

L. D. Stratton[22] made a study of the metabolism of a sub-breathing stammerer as indicated by urinary creatine and creatinine. He states: "Times of excitement are accompanied by less creatinine and more stammering . . . the more nearly the creatinine coefficient

[9] Fletcher, *Op. cit.*

[10] Fossler, H. R., "Disturbances in Breathing During Stuttering," *Psychol. Rev. Monograph Supplements,* XL 1930, p. 1.

[11] Gerard, Ralph W., "Metabolism of Nerves and the Problem of Degeneration," *Arch. Neur. and Psychiat.,* XXVI 1931, p. 884.

[12] Mathews, Albert P., *Physiological Chemistry,* ed. 4, William Wood and Co., 1927.

[13] Scripture, M. K., and Glassburg, J. A., "Use of Breathing in the Treatment of Speech Disorders," *Oralism and Auralism,* V 1926, p. 59.

[14] Starr, H. E., "The Hydrogen-ion Concentration of the Mixed Saliva," *Am. J. Psychol.* XXXIII 1922, p. 394.

[15] Starr, H. E., "Psychological Concomitants of High Alveolar Carbon Dioxide; A Psychobiochemical Study of the Etiology of Stammering," *Psychol. Clinic,* XVII March, 1928, p. 1.

[16] Stratton, L. D., "A Factor in the Etiology of the Breathing of a Sub-breathing Stammerer," *J. Comp. Psychol.,* IV 1924, p. 325.

[17] Travis, L. E., "Studies in Stuttering: I. Disintegration of the Breathing Movements During Stuttering," *Arch. Neurol. and Psychiat.,* XVIII 1927, p. 673.

[18] Trumper, M., "Hemato-Respiratory Study of 101 Consecutive Cases of Stammering," *Ph.D. Thesis,* Univ. of Penn., 1929.

[19] Twitmyer, E. B., "Stammering in Relation to Hemo-Respiratory Factors," *Quar. J. of Speech,* XVI 1930, p. 278.

[20] Starr, H. E., "The Hydrogen-ion Concentartion of the Mixed Saliva," *Am. J. Psychol.,* XXXIII 1922, p. 394.

[21] Starr, H. E., "Psychological Concomitants of High Alveolar Carbon Dioxide; A Psychobiochemical Study of the Etiology of Stammering," *Psychol. Clinic,* XVII March, 1928, p. 1.

[22] Kugelmass, Newton I., and Shohl, A. T., "The Determination of the Equilibria Involving Calcium, Hydrogen, Carbonate, Bicarbonate, and Primary, Secondary and Tertiary Phosphate Ions," *J. Biol. Chem.,* LVIII, 1923-24, p. 649.

approaches the normal and maintains it, the better the speech performance. It is believed that in sub-breathing stammerers, if the urinary creatinine coefficient is low, it may be concluded that an important factor in the etiology of stammering is a faulty metabolism and this must be corrected to effect a cure."

Max Trumper in his hemato-respiratory study of 101 cases of stammering[23] found a correlation between the type of breathing and the red cell count and the hemoglobin content. He states that the scarcity of women stammerers is due in part to the lower viscosity of their blood which in turn is due to a lower red cell volume.

Johnson, Stearns and Warweg[24] have reported normal or high normal findings in regard to blood serum calcium, inorganic phosphate, potassium and glucose of stutterers.

Finally Browning[25] has associated stuttering with the involution of the thymus and Gordon[26] has reported the production of stuttering in four patients to whom excessive amounts of thyroxin were administered.

The foregoing contributions are suggestive of a disturbed metabolism in the stutterers. But more must be known concerning these metabolic changes which produce and maintain the bodily condition manifested in stuttering before the condition can be reversed and the impediment permanently corrected.

It has been the purpose of these studies to determine specifically how the metabolism of the stutterer as evidenced by blood serum calcium, inorganic phosphate, potassium, chloride, cholesterol, non-protein nitrogen, total protein, albumin, globulin, and glucose differs from that of the non-stutterer.

Procedure

In obtaining and handling the blood as many factors as possible were kept constant and were the same for both stutterers and non-stutterers. The patients came into the laboratory usually between eight and nine o'clock in the morning without breakfast. Thirty-five cubic centimeters of blood were drawn from either the basilic or

[23] Trumper, M., *Op. cit.*

[24] Johnson, Wendell, Stearns, Genevieve, and Warweg, Edna, "Chemical Factors and the Stuttering Spasm," *Quar. J. of Speech*, XIX, 1933, p. 408.

[25] Browning, William, *The Etiology of Stammering and Methods for its Treatment*, A. T. Huntington, Brooklyn, N. Y., Vol. I, No. 4, June 22, 1915.

[26] Gordon, M. B., "Stammering Produced by Thyroid Medication," *Am. J. M. Sc.*, CLXXV, 1928, p. 360.

cephalic vein. A quantity of the blood was oxalated and the remainder centrifuged to obtain serum. The techniques of handling the oxalated blood and sera will be found under methods used for the various determinations. The same methods were used, without variation, for both groups, throughout these studies. The number of cases and their age and sex may be found in Table I.

Methods

Collip and Clark's modification of the Kramer and Tisdall method[27] was used for the total serum calcium. A modification of the Greenberg and Gunther method[28] was used for the determination of the diffusible and non-diffusible calcium. The modification consisted in the use of a 15 cc. graduated centrifuge tube in place of the Folin sugar tube used in the original method for the filtrate. The filtrate was collected, measured and analyzed in the one graduated centrifuge tube. Collip and Clark's method for calcium was used instead of the Van Slyke and Sendroy gasometric method.[29] Analyses were made on both the diffused and non-diffused portions of the serum and their sums compared with amount of total serum calcium. A duplication of the apparatus between the cylinder of mercury and the water flask permitted the determination of two samples at the same time.

The inorganic phosphate was determined by the method of Fiske and Subbarow.[30] Mezzi and Rossi's method[31] was used for potassium. Hawk and Bergeim's modification[32] of the Meyers and Wardell method for cholesterol, Whitehorn's method[33] for chlorides,

[27] Clark, E. P., and Collip, J. B., "Study of the Tisdall Method for the Determination of Blood Serum Calcium with a Suggested Modification," *J. Biol. Chem.*, LXIII, 1925, p. 461.

[28] Greenberg, David M., and Gunther, Lewis, "On the Determination of Diffusible and Non-Diffusible Serum Calcium," *J. Biol. Chem.*, LXXXV, 1929-30, p. 491.

[29] Van Slyke, D. D., and Sendroy, J., "Gasometric Determination of Blood Calcium," *Proc. Soc. Exper. Biol. and Med.*, XXIV, 1926, p. 167.

[30] Scripture and Glassburg, *Op. cit.*

[31] Mezzi, F. P., and Rossi, A., *Arch Di Schienze Geologiche*, Vol. XIII, N. Luglio, 1929, p. 466-72.

[32] Hawk, Philip B., and Bergeim, Olaf, *Practical Physiological Chemistry*, ed. 9, P. Blakiston's Son and Co., Philadelphia, Penn., 1927.

[33] Whitehorn, J. C., "A System of Blood Analysis: Supplement 1. Simplified Method for the Determination of Chlorides in Blood Plasma," *J. Biol. Chem.*, XLV, 1921, p. 449.

TABLE I.

Showing Results of Blood Analyses for Stutterers and Non-Stutterers.*

Constituent	*No. Normal Cases*	*No. N. ♂*	*No. N. ♀*	*Age Range*	*No. Stutterers*	*No. St. ♂*	*No. St. ♀*	*Age*	*Mean*		*Mean Variation*		*P. E. of Mean*		*Dif. of Means*	*P.E. of Dif.*	*Critical Ratio Dif. P. E. Dif.*	*Chances in 100 of true d. greater than zero*
									N.	*St.*	*N.*	*St.*	*N.*	*St.*				
Total Serum Calcium	23	16	7	6-39	49	39	10	6-32	11.08	11.70	0.79	0.994	0.139	0.120	0.62	0.186	3.33	99
Non-diffusible Calcium	15	9	6	20-39	20	16	4	12-32	7.93	8.76	0.79	0.76	0.172	0.143	0.83	0.223	3.72	99
Diffusible Calcium ..	15	9	6	20-39	21	17	4	12-32	3.29	3.22	0.57	0.37			0.07	0.143	0.48	62
Inorganic Phosphorus .	15	9	6	20-39	19	15	4	12-32	4.11	4.72	0.485	0.559	0.105	0.122	0.61	0.161	3.77	99
Chlorides (NaCl) ...	13	8	5	20-39	10	9	1	16-29	378.00	379.00	39.90	28.00	9.70	7.48	1.00	12.24	0.08	51
Potassium	14	8	6	20-39	12	11	1	16-29	19.07	17.80	1.61	1.49	0.363	0.360	1.263	0.511	2.47	95
Cholesterol	11	8	3	20-39	12	10	2	12-32	155.20	159.40	20.68	19.80	5.53	4.84	4.20	7.34	0.57	64
N. P. N.	15	10	5	20-39	16	15	1	16-32	30.80	31.80	2.79	4.64	0.603	0.898	1.00	1.08	0.92	73
Total Protein	15	10	5	20-39	17	15	2	12-32	7.88	6.88	1.01	0.954	0.2206	0.1933	0.10	0.293	3.40	99
Albumin	15	10	5	20-39	17	15	2	12-32	5.08	4.63	0.45	0.88	0.101	0.1805	0.46	0.206	2.18	92
Globulin	15	10	5	20-39	17	15	2	12-32	2.89	2.21	0.65	0.413	0.120	0.084	0.68	0.148	4.59	100
A/G Ratio	15	10	5	20-39	17	15	2	12-32	1.85	2.13	0.421	0.664	0.095	0.136	0.28	0.165	1.70	87
Glucose	23	11	12	20-39	33	28	5	12-32	104.80	123.10	13.80	22.80	2.48	3.35	18.30	4.17	4.38	100

* The statistical formulae and tables as found in Garrett's *Statistics in Psychology and Education*[37] were used in this study.

[37] Garrett, Henry E., *Statistics in Psychology and Education*, Longmans, Green and Co., 1926, 168.

and Folin and Wu's method[34, 35] for blood sugar were used. The non-protein nitrogen and blood proteins were determined by the Koch-McMeekin method in combination with the methods of Howe and Wu as described by Hawk and Bergeim.[36]

Results

Reliable differences have been found (mostly within the normal range) between the blood of the stutterers and that of the normals. These differences are of two kinds: (1) those differences in quantity of the various substances analyzed as summarized in Table I, and (2) the differences that exist in the manner in which these various substances are associated with each other as summarized in Table II.

Recent researches[39, 40, 41, 42, 43, 44, 45, 46, 47, 48] have definitely associated the ionized fraction of the inorganics with nerve (somatic and autonomic) and muscle (striated, smooth, and cardiac) excit-

[34] Folin, O., and Wu, H., "A System of Blood Analysis," *J. Biol. Chem.*, XXXVIII, 1919, pp. 80-87; *ibid.*, pp. 106-110.

[35] Folin, O., and Wu, H., "A System of Blood Analysis: Supplement 1. A Simplified Method for the Determination of Sugar," *J. Biol. Chem.*, XLI, 1920, p. 367.

[36] Hawk, Philip B., and Bergeim, Olaf, *Practical Physiological Chemistry*, ed. 9, P. Blakiston's Son and Co., Philadelphia, Penn., 1927.

[39] Bayliss, W. M., *Principles of General Physiology*, ed. 3, Longmans, Green and Co., London, 1920, p. 125, p. 426.

[40] Cannon, W. B., *Bodily Changes in Pain, Hunger, Fear and Rage*, D. Appleton, and Co., New York, 1929.

[41] Cantarow, Abraham, *Calcium Metabolism and Calcium Therapy*, Lea and Febiger, 1931.

[42] Freeman, N. E., Phillips, R. A., and Cannon, W. B., "An Unsuccessful Attempt to Demonstrate Humoral Action of *Vagus Substance* in the Circulating Blood," *Am. J. Physiol.*, XCVIII, 1931, p. 435.

[43] Hawk and Bergeim, *Op. cit.*

[44] Howell, W. H., *Textbook of Physiology*, ed. 11, W. B. Saunders Co., Philadelphia, Penn., 1931.

[45] Macleon, J. J. R., *Physiology and Biochemistry in Modern Medicine*, The C. V. Mosby Co., St. Louis, Mo., 1930.

[46] Mathews, *Op. cit.*

[47] Newton, H. F., Zwemer, R. L., Cannon, W. B., "Studies on Conditions of Activity in Endocrine Organs; Mystery of Emotional Acceleration of Denervated Heart after Exclusion of Known Humoral Accelerators," *Am. J. Physiol.*, XCVI, 1931, p. 377.

[48] Peters, J. P., and Van Slyke, D. D., *Quantitative Clinical Chemistry*, Vol. I, *Interpretations*, William and Wilkins Co., 1931.

TABLE II

SUMMARY OF PARTIAL CORRELATIONS OF ZERO ORDER*

	Normals	*Stutterers*
Total Serum Ca and Potassium	—0.33	—0.228
Total Serum Ca and Phosphate	—0.634	+0.525
Total Serum Ca and Total Protein	+0.595	—0.0306
Potassium and Phosphate	+0.567	—0.188
Potassium and Total Protein	—0.716	+0.834
Phosphate and Total Protein	—0.268	—0.418

ability, with membrane (muscle, nerve, blood vessel, and capillary) permeability, with the conduction of the nerve impulse along the nerve fiber, across the synapses between the nerve fiber and the nerve cell and from nerve fiber to muscle across the myoneural junction. The whole body organism is adjusted to a specific blood content that must be maintained to insure normal composition and function. "The general character of this equilibrium is such that a change made in the concentration of one of the components produces a measurable change in all the others.[49] In discussing the mechanism that maintains the electrolytic balance in the blood, Peters and Van Slyke[50] state that associated with the bases, Na, K, Ca, and Mg, are the anions, Cl, HCO_3, PO_4, SO_4, protein and organic acid anions. "The entire course of the disturbance in anion relationships may be run with little or no change in the concentration of the total base, or even of the individual bases." All forms of tetany are believed to be caused by a disturbance of the ionized portion of one or more of the inorganics as expressed in the equation $\frac{Na + K}{Ca + Mg}$. The monovalent elements Na and K, in excess, increase permeability and heighten nerve and muscle excitability, and excess of calcium decreases permeability by constricting and increasing the tone of the membrane and thus has an inhibiting effect on nerve and muscle irritability. The forces that influence the equilibrium are those that control the partition and distribution of the inorganics.

The blood is the medium in which all metabolic exchanges are made and is therefore the environment in which muscle and nerve tissue live and function. Since normal life and function are dependent upon a definite equilibrium of the blood contents, the converse holds that abnormal function may be due to a disturbed equilibrium

* The statistical formulae and tables as found in Garrett's *Statistics in Psychology and Education*[38] were used in this study.

[38] Garrett, *Op. cit.* [49] Cantarow, *Op. cit.* [50] Cantarow, *Op. cit.*

of the blood contents as reflected in the metabolism and composition of the nerve and muscle. The composition of the nerve and muscle determines whether the reception of and reaction to stimuli of all kinds can be classified as normal. The nerve impulse is not an entity within itself. The clonic and tonic myospasms of the stutterer are factual evidence of abnormal function. It is evident that if the afferent, associational, or efferent nerve impulses of the stutterer differ from those of the non-stutterer, then somewhere along the nerve fiber, its cell or ganglion, will be found the change in composition that must predispose the change in the character of the impulse. Likewise if the musculature of the stutterer is different from that of the non-stutterer, the difference must be one of composition.

To say that stuttering is caused by faulty visualization, temporary auditory amnesia, a lowered cerebral dominance, oral eroticism,[51, 52] or anything else without having proven the absence of other factors is substituting a blanket term which should be resolved into metabolic factors. It is believed that the above so-called causes of stuttering along with the slower jaw and brow movements and possible certain changes in the urine and blood are concomitant variations and all are manifestations of the basic disorder that causes stuttering. Proof of this is the large number of stutterers in whom the impediment is transitory and the above concomitant variations are adjusted by the same bodily processes that correct the speech. It is recognized that psychological and sociological forces may condition metabolism and metabolism may then affect the composition of nerve and muscle tissue thus changing function. Unfortunately, however, few mental activities can be determined biochemically, and even if speech could be proved to be entirely a psychic phenomenon, the incoordination of the respiratory musculature, that has been quite universally observed in stutterers, would still remain unexplained and would continue to disturb speech.*

Whatever the force is that affects the functioning of the oral

* Of especial interest in this regard is the influence of the carotid sinus reflexes on speech which is being investigated in this laboratory at the present time.

[51] *Symposium on Stuttering:* Technical papers delivered at the 1930 Convention of the American Society for the Study of Disorders of Speech held at Chicago, Robert West, editor, Madison, Wisconsin.

[52] Technical papers delivered before the convention of the American Society for the Study of Disorders of Speech held at Detroit, Michigan, Dec. 28-31, 1931, Robert West, editor, Madison, Wisconsin.

and respiratory musculature, it must cause a change in composition of nerve, muscle, or circulating tissue, otherwise the function would not be affected. The etiology of stuttering will be known when the metabolic changes which predispose the disorder have been established. And scientific therapy can only be practiced when nature's method of curing stuttering, by a re-adjustment of these same body processes, is known.

It is generally recognized that the stutterer appears to be normal in everything except speech. The fact that he is such a surprisingly normal human being explains why the impediment has remained a mystery throughout the centuries. I have been accumulating biochemical data for the past five years, but until a year ago had taken little time to evaluate the material. The results seemed to be within the normal range for both the normals and stutterers for practically everything tested. When it was recognized that important differences could occur within the so-called normal range, the results took on new significance. Johnson, Stearns and Warweg[53] made the mistake of using "textbook normals" as controls, and they failed to appreciate the fact that important variations may occur within the theoretical normal range and that results are valueless without controls. It is also unfortunate that they did not appreciate the importance of the total proteins in determining the amounts of calcium and inorganic phosphate. As Peters and Eiserson[54] state, "the value of serum calcium cannot be interpreted unless both protein and phosphate are simultaneously determined or are known to be normal." It is interesting, however, to note that the high normal serum calcium finding of Johnson, Stearns and Warweg for 15 stutterers substantiates the results of the total serum calcium analyses on 49 stutterers herein reported.

The variations in the quantities of the different substances are summarized in Table 1 and the probability of there being a true difference is given for each substance. The globulin of the stutterers is 22.7% lower than that of the normals, and the probability that this is a real difference is 100 chances in 100. The sugar of the stutterers is 17.4% higher than that of the normals and the probability is 100 chances in 100 that there is a true difference. The stutterers have a 14.8% higher inorganic phosphate than the normals

[53] Johnson, Stearns and Warweg, *Op. cit.*

[54] Peters, J. P., and Eiserson, L., "The Influence of Protein and Inorganic Phosphorus on Serum Calcium," *J. Biol. Chem.*, LXXXIV, 1929, p. 155.

and the chances are 99 in 100 that a true difference exists. Similarly the chances are 99 in 100 that the stutterers have a lower total protein (12.6%) and a higher non-diffusible (10.4%) and total serum (5.59%) calcium. Potassium is 6.63% lower in the stutterers than in the normals and the probability is 95 chances in 100 that a true difference exists. Likewise, the albumin is lower (8.85%) in the stutterers than in the normals and the chances of a true difference here are 92 in 100. And for the other substances as shown in Table I, non-protein nitrogen, diffusible calcium, cholesterol, and chlorides, there is not a sufficient difference to warrant any consideration.

A final interpretation of the foregoing differences cannot be given at this time. It was first thought that possibly the stutterer had a low serum calcium, as the use of parathormone, an extract of the parathyroid gland, in temporarily arresting stuttering seemed to indicate that this was true. But an analysis of 31 stutterers for serum calcium resulted in a high normal serum calcium. This more complete blood study was undertaken and the calcium was partitioned into the diffusible and non-diffusible fractions. The results for the diffusible calcium are lower and for the non-diffusible calcium are higher for both groups than the results obtained by other workers. I cannot explain this discrepancy but whatever the error, if there is one, it remained constant throughout the experiments and was the same for both groups. But it is doubtful whether or not the diffusible and non-diffusible partition would be of much significance since it is the ionized portion of the diffusible calcium that influences muscle and nerve irritability. It is this fraction that should be tested in the stutterers as soon as a method is available. The total serum calcium, being high, is possibly a compensatory increase to maintain the proper partition of the diffusible calcium into the ionized and un-ionized fractions. The action of the parathyroid extract could be explained on the basis of its known effect on the viscosity of the blood. The stutterers were found to have a lower blood protein than the normals. A decrease in blood protein would indicate a lowered viscosity of the blood. The parathyroid extract is known to increase the viscosity of the blood so this could have possibly caused the observed result on stuttering.

The stutterer's potassium is just about as low as his total serum calcium is high, as compared with the normals. The high inorganic phosphate and low total protein is believed to be due to the shift in the blood pattern to protect the base equilibrium.

The high blood sugar of the stutterer is interpreted as evidence of his irritability. He over-reacts to stimuli. The suprarenal glands are stimulated by sympathetic impulses, glycogen is broken down into glucose, which is the immediate fuel of the body for flight or fight. Other changes take place, and in this regard a re-interpretation of the results obtained by Starr[55] in his study of the pH of mixed saliva of stutterers is suggested. Starr assumed that a change in the pH of the mixed saliva is indicative of a similar change in the pH of the blood. He failed to consider the dilution factor which may be controlled through sympathetic stimulation. The salivary pH will shift with the water content and may in this way vary entirely independently of any pH change in the blood. The fact that many of the patients, as Starr reported, took several minutes to produce sufficient saliva for the test is evidence that the water content was small and that the salivary glands were responding to primitive biological stimuli in an attempt to conserve body fluids. The results of Starr's work demonstrate the instability of the stutterer's sympathetic control.

Also Trumper's[56] data when averaged as one case gives results that fall within the theoretical normal for everything determined excepting the red cell count which averages a little higher than the "textbook normal." That there is a significant variation within the normal range for the factors which Trumper measures is possible. But a difference such as can be estimated statistically must be checked by control determinations. Trumper's finding of a high erythrocyte count in the stutterer's blood is important and is here interpreted to be due to sympathetic stimulation of the spleen. Cannon and his co-workers[57] have shown that the erythrocytes are increased during emotional changes and that the increase is due to a sympathetic stimulation of the spleen. So the high blood sugar is believed to be an indication of the emotionality of the stutterer. The effect of a continued over-stimulation of the sympathetics on the osmotic pressure of the blood and the resulting effects on the blood pattern cannot at the present time be evaluated. It is, however, believed that compensatory adjustments develop and that the degree of emotionality is not accurately reflected in the adult stutterer by

[55] Starr, H. E., "The Hydrogen-ion Concentration of the Mixed Saliva," *Am. J. Psychol.*, XXXIII (1922), 394.

[56] Trumper, *Op. cit.*

[57] Cannon, *Op. cit.*

either the blood sugar, the salivary pH, or the erythrocyte count.

In plotting the data several unusual relationships were noted between the various blood constituents.* It was suggested that correlations be made for the different substances in both groups. This was the only manner in which the observed differences on the graphs could be objectively verified and their reliability established.

It was found that in the normals when the total serum calcium increased, the total protein increased; they were positively correlated. In the stutterers, total serum calcium and total protein are slightly negatively correlated. Total serum calcium and inorganic phosphate have been established to be inversely or negatively correlated in normal blood and it was found so correlated in the normals of this study. In the stutterers, however, when the serum calcium increased the phosphate increases or they are positively correlated. Potassium and phosphate are positively correlated in the normals and slightly negatively correlated in the stutterers. And again, potassium is inversely correlated with total protein in the normals and positively correlated in the stutterers. The non-protein nitrogen has been found to be positively associated with total protein, albumin, and globulin in the normals and the same substances are negatively associated in the stutterers. It is recognized that these normal correlations between non-protein nitrogen and the proteins are contrary to prevailing opinion. There is not supposed to be any relationships between these products yet the fact remains that there is and the explanation must await further study.

The differences that have been noted in the relationship of calcium, potassium, inorganic phosphate and total protein are believed to be due to shifts in the anions (protein and phosphate) to protect the base of the blood, because it is the composition of the base as expressed in the equation $\frac{Na\ K}{Mg\ Ca}$ that is of greatest importance physiologically. That such a shift is possible is noted by Peters and Van Slyke.[58] The precipitating cause of this rearrangement could possibly be any of the factors which maintain influence and the partition and distribution of these various substances. Since stuttering is a phenomenon of childhood the greatly increased demand for

* Help was received from the Mathematics Department of the University of Wisconsin in working with the problem.

[58] Cantarow, *Op. cit.*

materials for growth and energy during this period must contribute to the rearrangement.

The difference in the electrolyte pattern between the stutterers and the normals is believed to be of great importance. It is in line with recent work by Atchley and Benidict[59] who have studied the serum electrolytes in normal and pathological conditions, and also a recent publication by Atchley, Loeb, Benidict and Driscoll[60] on electrolytic balances following the withdrawal and re-establishment of insulin therapy. The observed blood pattern for stutterers and non-stutterers is being checked at the present time by noting the shift of the various relationships upon the ingestion of large amounts of glucose, upon the injection of calcium chloride, after breathing carbon dioxide, and after breathing pure oxygen. These same studies will have to be made with children to ascertain if changes in quantities and arrangement of the blood constituents accompanies the initiation of stuttering.

SUMMARY

Stutterers have a higher total serum calcium than non-stutterers. The study of the partition of the calcium must await a method for the ionized fraction of the diffusible portion.

The inorganic phosphate is higher in stutterers than in normals.

The potassium is lower in stutterers than in normals.

The total protein, albumin, and globulin are lower in stutterers than in non-stutterers.

There is no great difference in non-protein nitrogen between the two groups.

There is no appreciable difference in diffusible calcium, cholesterol, and chlorides for the two groups.

The stutterers have a high blood sugar as compared with non-stutterers. A re-interpretation of the work by Starr and that of Trumper tends to further prove the stutterer's sympathetic instability.

The blood pattern of the stutterer, as shown by the correlations

[59] Atchley, Dana W., and Benidict, E. M., "Serum Electrolyte Studies in Normal and Pathological Conditions, pneumonia, renal edema, cardiac edema, uremic and diabetic acidosis," *J. Clin. Invest.*, IX, 1930, p. 265.

[60] Atchley, Dana W., Loeb, R. F., Richards, D. W., Jr., Benidict, E. M., and Driscoll, M. E., "On Diabetic Acidosis. A Detailed Study of Electrolyte Balances following the withdrawal and re-establishment of Insulin Therapy," *J. Clin. Invest.*, XII, 1933, p. 297.

of total serum calcium, potassium, inorganic phosphate, total protein, and non-protein nitrogen, is practically the reverse of the pattern of the non-stutterer.

Conclusion

Differences in quantities of blood serum calcium, inorganic phosphate, potassium, total protein, globulin, and sugar, and variations in the blood pattern as shown in the correlations between serum calcium, potassium, inorganic phosphate, and total protein justify the conclusion that stuttering is a manifestation of a disturbed metabolism.

It is not too much to hope that some day stuttering will be completely controlled by dietary means in regulating the metabolism of the child. But the metabolic changes which take place in producing and maintaining stuttering must first be established.

BIBLIOGRAPHY

Atchley, Dana W. and Benidict, E. M., "Serum Electrolyte Studies in Normal and Pathological Conditions, pneumonia, renal edema, cardiac edema, uremic and diabetic acidosis," *J. Clin. Invest.*, IX (1930), 265.

Atchley, Dana W., Loeb, R. F., Richards, D. W., Jr., Benidict, E. M., and Driscoll, M. E., "On Diabetic Acidosis. A Detailed Study of Electrolyte Balances following the withdrawal and re-establishment of Insulin Therapy," *J. Clin. Invest.*, XII (1933), 297.

Bayliss, W. M., *Principles of General Physiology*, ed. 3, Longmans, Green and Co., London, 1920, 125, 426.

Browning, William, *The Etiology of Stammering and Methods for its Treatment*, A. T. Huntington, Brooklyn, N. Y., Vol. I, No. 4, June 22, 1915.

Cannon, W. B., *Bodily Changes in Pain, Hunger, Fear, and Rage*, D. Appleton and Company, New York, 1929.

Cantarow, Abraham, *Calcium Metabolism and Calcium Therapy*, Lea and Febiger, 1931.

Clark, E. P. and Collip, J. B., "A Study of the Tisdall Method for the Determination of Blood Serum Calcium with a Suggested Modification," *J. Biol. Chem.*, LXIII (1925), 461.

Fiske, C. H. and Subbarow, Y., "The Colorimetric Determination of Phosphorus," *J. Biol. Chem.*, LXVI (1925), 375.

Fletcher, J. M., *The Problem of Stuttering*, Longmans, Green and Co., 1928.

Folin, O. and Wu, H., "A System of Blood Analysis," *J. Biol. Chem.*, XXXVIII (1919), 80-87; *ibid.*, 106-110.

Folin, O. and Wu, H., "A System of Blood Analysis: Supplement 1. A Simplified Method for the Determination of Sugar," *J. Biol. Chem.*, XLI (1920), 367.

Fossler, H. R., "Disturbances in Breathing During Stuttering," *Psychol. Rev. Monograph Supplements,* XL (1930), 1.

Freeman, N. E., Phillips, R. A., and Cannon, W. B., "An Unsuccessful Attempt to Demonstrate Humoral Action of *Vagus Substance* in the Circulating Blood," *Am. J. Physiol.,* XCVIII (1931), 435.

Garrett, Henry E., *Statistics in Psychology and Education,* Longmans, Green and Co., 1926, 168.

Gerard, Ralph W., "Metabolism of Nerves and the Problem of Degeneration," *Arch. Neur. and Psychiat.,* XXVI (1931), 884.

Gerard, R. W., "Nerve Metabolism," *Physiol. Rev.,* XII (1932), 469.

Gordon, M. B., "Stammering Produced by Thyroid Medication," *Am. J. M. Sc.,* CLXXV (1928), 360.

Greenberg, David M. and Gunther, Lewis, "On the Determination of Diffusible and Non-Diffusible Serum Calcium," *J. Biol. Chem.,* LXXXV (1929-30), 491.

Hawk, Philip B. and Bergeim, Olaf, *Practical Physiological Chemistry,* ed. 9, P. Blakiston's Son and Co., Philadelphia, Penn., 1927.

Howell, W. H., *Textbook of Physiology,* ed. 11, W. B. Saunders Co., Philadelphia, Penn., 1931.

Johnson, Wendell, Stearns, Genevieve, and Warweg, Edna, "Chemical Factors and the Stuttering Spasm," *Quart. Jour. of Speech,* XIX (1933), 408.

Kugelmass, Newton I. and Shohl, A. T., "The Determination of the Equilibria Involving Calcium, Hydrogen, Carbonate, Bicarbonate, and Primary, Secondary and Tertiary Phosphate Ions," *J. Biol. Chem.,* LVIII (1923-24), 649.

Macleod, J. J. R., *Physiology and Biochemistry in Modern Medicine,* The C. V. Mosby Co., St. Louis, Mo., 1930.

Mathews, Albert P., *Physiological Chemistry,* ed. 4, William Wood and Co., 1927.

Mezzi, F. P. and Rossi, A., *Arch. Di Scienze Geologiche,* Vol. XIII N, Luglio, 1929, 466-72.

Newton, H. F., Zwemer, R. L., Cannon, W. B., "Studies on Conditions of Activity in Endocrine Organs; Mystery of Emotional Acceleration of Denervated Heart after Exclusion of known Humoral Accelerators," *Am. J. Physiol.,* XCVI (1931), 377.

Peters, J. P. and Eiserson, L., "The Influence of Protein and Inorganic Phosphorus on Serum Calcium," *J. Biol. Chem.,* LXXXIV (1929), 155.

Peters, J. P. and Van Slyke, D. D., *Quantitative Clinical Chemistry,* Vol. I, *Interpretations,* William and Wilkins Co., 1931.

Robbins, S. D., *Stammering and Its Treatment,* Boston Stammerers Inst. 1926.

Scripture, M. K. and Glassburg, J. A., "Use of Breathing in the Treatment of Speech Disorders," *Oralism and Auralism,* V (1926), 59.

Special Education—The Handicapped and the Gifted, Report of the Committee on Special Classes at White House Conference on Child Health and Protection, The Century Co.

Starr, H. E., "The Hydrogen-ion Concentration of the Mixed Saliva," *Am. J. Psychol.,* XXXIII (1922), 394.

Starr, H. E., "Psychological Concomitants of High Alveolar Carbon

Dioxide; A Psychobiochemical Study of the Etiology of Stammering," *Psychol. Clinic,* XVII (March 1928), 1.

Stratton, L. D., "A Factor in the Etiology of the Breathing of a Subbreathing Stammerer," *J. Comp. Psychol.,* IV (1924), 325.

Symposium on Stuttering: Technical papers delivered at the 1930 Convention of the American Society for the Study of Disorders of Speech held at Chicago, Robert West, editor, Madison, Wisconsin.

Technical papers delivered before the convention of the American Society for the Study of Disorders of Speech held at Detroit, Michigan, Dec. 28-31, 1931, Robert West, editor, Madison, Wisconsin.

Technical papers presented at the 1932 Convention of the American Society for the Study of Disorders of Speech, Robert West, editor, Madison, Wisconsin.

Travis, L. E., "Studies in Stuttering: I. Disintegration of the Breathing Movements During Stuttering," *Arch. Neurol. and Psychiat.,* XVIII (1927), 673.

Travis, L. E., *Speech Pathology,* Appleton and Co., 1931.

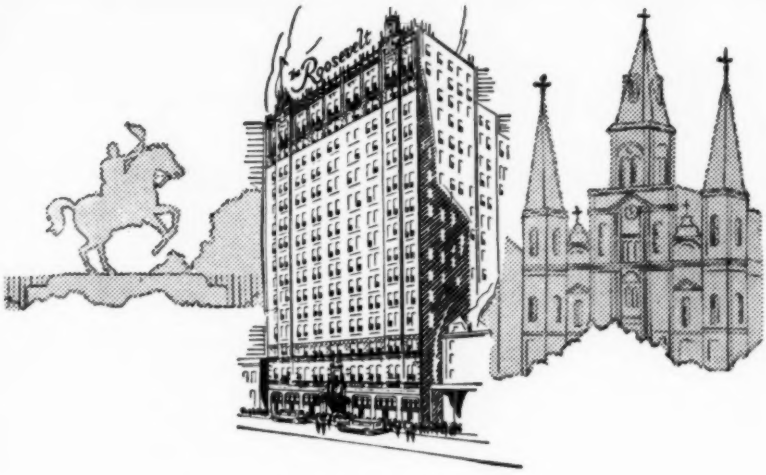
Trumper, M., "Hemato-respiratory Study of 101 Consecutive Cases of Stammering," *Ph.D. thesis,* University of Penn., 1929.

Twitmeyer, E. B., "Stammering in Relation to Hemo-respiratory Factors," *Quart. Jour. of Speech,* XVI (1930), 278.

Van Slyke, D. D. and Sendroy, J., "Gasometric Determination of Blood Calcium," *Proc. Soc. Exper. Biol. and Med.,* XXIV (1926), 167.

West, Robert, "A Neurological Test for Stutterers," *The Journal of Neurol. and Psychopath.,* X, XXXVIII (1929), 114.

Whitehorn, J. C., "A System of Blood Analysis: Supplement 1. Simplified Method for the Determination of Chlorides in Blood Plasma," *J. Biol. Chem.,* XLV (1921), 449.



Official

HEADQUARTERS

1934 Convention

National Association of Teachers of Speech

December 27, 28, and 29

Warm cordiality, an atmosphere of rare beauty and good taste, a sincere regard for your well-being—plus the modern equipment, service and the fine, satisfying foods that make comfortable living away from home possible. These things have won and kept leadership for The Roosevelt, convention headquarters in the South.

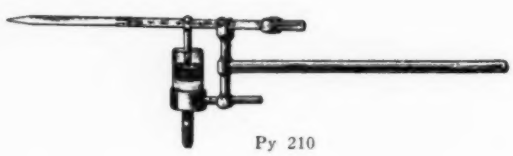
These indispensible things are yours to command at the most moderate tariff. Rooms with bath from $3.00.

Special Attention Given Reservation of Delegates.

Write or Wire Jas. Pat. O'Shaughnessy, Manager

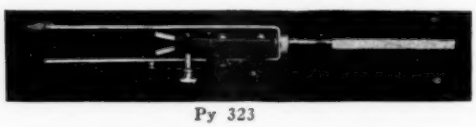
The Roosevelt
NEW ORLEANS
"Pride of the South"

Laboratory Equipment for Speech Departments



Py 210

Py 220



Py 323

We manufacture Kymographs, Tambours, Electric Tuning Forks, Clamps and many special items useful in laboratories in speech research.

Our catalog will be furnished cheerfully upon request.

Mfg. by

EBERBACH & SON CO., Inc.

ESTABLISHED 1843

Ann Arbor Michigan

U. S. A.

SCHOOL OF SPEECH

COURSES

Leading to

Undergraduate

and

Graduate Degrees

Northwestern University

HELP YOUR DEBATERS

with

Our Debate Handbooks

Arguments pro and con, evidence in the words of those qualified to speak with authority, facts and statistics, bibliographies and briefs, all have been sifted and the best collected and arranged logically within the covers of one compact book on each of many questions your debaters will ask for.

You can give better service at less cost to yourself and assistants and with less strain on your reference tools than in any other way. They are just as useful to the man who wants information as to the debater.

Write for Complete Descriptive List of Debate Material including

The Reference Shelf

60 TITLES

Furnishes briefs, references, reprints of selected articles, study outlines and debates. Published irregularly. Ten numbers constitute a volume; approximately one volume a year. Each issue devoted to one topic.

EACH 90c

The Handbook Series

40 TITLES

Includes a number of public questions on which everyone should be well informed. Each volume contains articles on the subject so selected as to reflect the opinions of leading authorities on various phases. An extensive bibliography guides one to further reading. Briefs are often included.

EACH $2.40

University Debaters' Annuals

9 VOLUMES

Each annual is a collection of representative intercollegiate debates with selected bibliography and briefs. **EACH $2.25**

DEBATERS' MANUAL

Compiled by EDITH M. PHELPS. (The Handbook Ser.) Contains articles on the complete procedure of debating, from organizing a debating society, drawing up its constitution, to selecting questions for debate, and preparing the speeches. **$1.50**

DEBATE COACHING

By CARROLL P. LAHMAN. In charge of Men's Debating, Western State Teachers College, Kalamazoo. (Handbook Series. Ser. IV. Vol. I.) A manual for teachers and coaches. Includes a good general survey of debating activities in this country. **$2.40**

DEBATE INDEX

An index to material on 330 subjects suitable for debate, including references to bibliographies, briefs, published debates or collections of articles. **90c**

THE H. W. WILSON COMPANY

950 University Avenue **New York City**

University of Southern California

SCHOOL OF SPEECH

Undergraduate Division. Theory and skill courses in Public Speaking, Debating, Voice and Diction, Interpretation, Story Telling, Staging of Poetry, Choral Speech, Radio Speech, Acting, Directing, Stagecraft, Make-up, Phonetics, Voice Science and Speech Correction. Primary emphasis is laid on the acquisition of skill in the various fields.

Graduate Division. Seminars in Public Speaking and Debate, Rhetorical Theory, Interpretation, Dramatics, and Speech Correction. Non-seminar courses in Advanced Public Speaking, Interpretation, Dramatics, Stagecraft, Phonetics, Voice Science and Psychology of Speech. The strictly graduate work presupposes the possession of skill and is directed largely toward the understanding of principles.

Forty-one candidates took the degree of Master of Arts in Speech at the June 1934 Commencement. These candidates came from twenty-seven different colleges and universities in various parts of the United States. Several candidates have received the Ph.D. with a minor in Speech.

Plans are being advanced looking toward the Ph.D. with a major in Speech. Announcement of the culmination of these plans may be expected during 1935.

School of Speech class registration numbered 1085 during the second semester of 1933-34. There are twelve members of the faculty.

Located at the cultural heart of the great southwest.

A friendly school, with a personal interest in every student.

Write for bulletins of the School of Speech, Summer Session and Graduate School.

Address: RAY K. IMMEL, Ph.D., Director, School of Speech,
University of Southern California,
University Park,
Los Angeles

SPEECH DEPARTMENT
WAYNE UNIVERSITY
DETROIT, MICHIGAN

Offers Graduate and Undergraduate work in speech during each semester and summer in four fields: Public Speaking, Interpretation, Dramatics, and Speech Science. Laboratory Work in the University Theatre, Speech Clinic, Radio Broadcasts, Verse Reading Choir, and Forensic Programs. Saturday and late afternoon courses for teachers.

For information write

Head of Department of Speech
WAYNE UNIVERSITY

Detroit **Michigan**

Public Speaking Today, Revised

LOCKWOOD and THORPE

The success of a textbook is measured by the place it makes for itself in the school curriculum. PUBLIC SPEAKING TODAY did pioneer work in giving speech training proper aims and direction and in vindicating for that subject a place in high schools. Its lessons were so clear, definite, and practical that it immediately established itself in schools all over the United States. Now revised and enlarged PUBLIC SPEAKING TODAY goes forth to meet the requirements of a new day.

The new matter in this book intensifies and clarifies rather than expands the work as originally laid out.

Radio had to be reckoned with and is fully treated within the scope of such a text.

The definite and practical chapter now added on How to Judge a Speech will be particularly welcomed by both students and teachers.

A chapter on Projects puts considerable new life into speech activities within the course and alongside of it.

A chapter on The High School Oration puts out certain inherent limitations and the wisdom of observing them.

A new, illustrated, section on Staging, in the chapter on The Spoken Drama, calls into play abilities which have been too often neglected.

Important as these additions are they account for only a small part of the increase in volume. This increase is chiefly in the added examples for study and particularly in examples of greater extent and scope. These make the book more complete and self-contained.

Pp. xxviii + 420 — Price $1.60

BENJ. H. SANBORN & CO.

221 East Twentieth Street
Chicago

185 Madison Avenue
New York

131 Clarendon Street
Boston

Twitmyer and Nathanson

Correction of Defective Speech

With Progress Charts. Illustrations. 413 Pages

Cloth - $3.50

This book provides a progressive course of exercises for all speech disorders. A series of original charts has been introduced. The book is of value to singers, public speakers and others to whom precision of speech is an asset.

Gould

Pocket Pronouncing Medical Dictionary

10th Edition Revised Improved (1934)

Flexible Fabrikoid, $2.00; Thumb Index, $2.50.

40,000 words Pronounced and Defined. Many Tables for Reference and Comparison. It covers the medical words of current usage. A large number of new words are given in this edition.

P. Blakiston's Son & Co., Inc.

1012 Walnut Street Philadelphia

Sustaining Membership

IN

THE NATIONAL ASSOCIATION OF TEACHERS OF SPEECH

At the 1930 convention of the National Association of Teachers of Speech, a new affiliation with the Association was created which is called "A Sustaining Membership,"—fee $10.00 per year.

This membership now entitles the holder to receive for any one year the following:

(1) **Membership in The National Association of Teachers of Speech;**

(2) **Subscription to The Quarterly Journal of Speech;**

(3) **One copy of all Speech Bulletins and Monographs in print, or to be published during the year;**

(4) **One copy of all other Supplementary publications to be published during the year;**

(5) **One bound volume of any four issues of The Quarterly Journal of Speech in print, or to be published during the year;**
(A Table of Contents of all available issues will be sent upon request.)

(6) **One complimentary ticket to the Annual Convention of The National Association of Teachers of Speech for the current year.**

The income from this membership enables the Association to expand The Quarterly Journal of Speech, and to undertake the publication of additional literature of professional interest to the teacher of Speech in the elementary school, high school, college, and university.

Inasmuch as other professional organizations make possible a similar affiliation, it is confidently believed that the pride and interest of the teacher of Speech in his profession will urge him to become a sustaining member in The National Association of Teachers of Speech.

G. E. Densmore, Executive Secretary
The National Association of Teachers of Speech
University of Michigan, Ann Arbor, Michigan

I enclose (check, money order) for $10.00 in payment of a sustaining membership in The National Association of Teachers of Speech and subscription to The Quarterly Journal of Speech for one year.

I elect to have the following four Quarterly Journals bound in book form.

(1)..... (2)..... (3)..... (4).....

Please mail Journal to:

Name .....

Street Address .....

City ..... State .....

Where
Teaching .....

THE SPEECH BULLETINS

supplement to

THE QUARTERLY JOURNAL OF SPEECH

SPEECH CONTESTS ISSUE, Volume III, Number 1:

Contest programs for various schools—Questions and answers by directors—Conduct and nature of contests now held throughout the United States—Methods of Judging—How directors train contestants—Values, objectives, awards, and credits—Much needed, specific information never before made obtainable.

Price: 50 cents

COURSE OF STUDY ISSUE, Volume III, Number 2:

Sample curricula from many schools—Several state recommended courses of study in Speech—Practical course outlines for Speech, Public Speaking, Debate, Dramatics, Interpretation, and other high school Speech courses—Recommendations of many educational committees concerning Speech—Problems in building a department.

Price: 50 cents

G. E. Densmore, Executive Secretary
The National Association of Teachers of Speech
University of Michigan, Ann Arbor, Michigan

I enclose (check, money order) for $..... in payment of

☐ Speech Bulletin(s): Speech Contests Issue $.....

☐ Speech Bulletin(s): Course of Study Issue $.....

Name .....

Street Address.....

City..... State.....

A Selected List of New Plays

FULL EVENING PLAYS

LOVE APPLES. Comedy in 3 acts. 2 easy sets. 7m., 4w. A clever play for advanced amateur groups. (Royalty $25.00)
Copies, 75 Cents.

LOVES IN LAVENDER. Farce-comedy in 3 acts. One interior. 5m., 7w. A play full of merry situations, delicious comedy and witty dialog. (Royalty $10.00)
Copies, 50 Cents

TRUTH BY STRATEGY. Comedy in 3 acts. Interior set. 13m., 6w. A good clean, clever play admirably suited to school use. (Royalty $10.00). **Copies, 50 Cents.**

TAFFY FINDS HERSELF. Comedy in 3 acts. 2 simple interior sets. 9 women. A fine play for an all-woman cast with good plot, good story and good dialog. (No Royalty) **Copies, 35 Cents.**

LET'S BE SOMEBODY. Comedy in 3 acts. One easy interior. 4m., 5w. The situations are real and wholesome, the dialog bright, the comedy excellent, the characters diversified and interesting and all parts good. A very good school play. (Royalty $10.00)
Copies, 50 Cents.

BELIEVE IT OR NOT. Farce-comedy in 3 acts. One set. 6m., 8w. Always a successful play for any group. (Royalty $25.00)
Copies, 75 Cents

NEW ONE-ACT PLAYS

OUT OF THE DARKNESS INTO THE LIGHT. A dramatic play for 3m., 1w., and a voice. Plays 25 minutes. An excellent play for church use. (No Royalty)
Copies, 35 Cents.

TREASURE HUNT. A play for 4m., 4w. Plays 30 minutes. A clever, sophisticated play that provides an excellent vehicle for advanced players. (Royalty $5.00)
Copies, 35 Cents.

ANYTHING YOU PLEASE. Comedy for six women. Plays 35 minutes. Just the play for Women's clubs. (Royalty $5.00)
Copies, 35 Cents.

THE PRINCE WANTS A CHERRY PIE. Comedy for 4m., 3 w. Plays 30 minutes. Clever plot, good story and excellent lines. Suited to adults or children. (Royalty $5.00) **Copies, 35 Cents.**

A PLEASANT EVENING. A play for 3 gentlemen and a part of a fourth. This weird and unusual play is highly recommended. (Royalty $10.00) **Copies, 35 Cents.**

IT'S A RACKET. Comedy for 2m., 2w. Plays 25 minutes. A very clever comedy with fine characterizations. (Royalty $5.00).
Copies, 35 cents.

GAWKY, TWELVE AND FRECKLED. Comedy for 3m., 1w. Plays 25 minutes. A really clever little play that is suited to adults or junior high age. (No Royalty).
Copies, 35 cents.

HIS MAJESTY SLEEPS. Comedy for 3m., 2w., and extras. Plays 30 minutes. The story and plot are novel and interesting. (No Royalty) **Copies, 35 Cents.**

THE PROPOSAL DRESS. An Irish costume play for 3m., 11w. (May be played by all women.) Plays 40 min. (No Royalty).
Copies, 35 Cents.

SCHOOLIN'. Play for 2m., 8 w. Plays 30 min. A prize play for adult groups. (Royalty $5.00.) **Copies, 35 Cents.**

New Stunt Books

1001 **ONE MINUTE BLACKOUTS.** By Charles F. Wright. Just the book for the lodge, club, assembly or any stunt program. (Ready Oct. 1st) Board Binding.
Postpaid, $2.10.

VAUDEVILLE WHAT-NOTS NO. 3. By Leslie H. Carter. The third book of this popular stunt series. Short acts and blackouts for every occasion. Also contains a "GAY NINETY REVUE" and a mock trial done to rythm. (No Royalty.)
Copies, 60 Cents.

New Monologue Books

THIRTY-TWO READINGS, MONOLOGUES and PLAY-O-LOGUES. By Marshall Stedman. A clever new collection for grown-ups. **Copies, 75 Cents.**

TWO UP-TO-THE-MINUTE MONOLOGUES. By Leslie H. Carter. Two modern monologues for men. **Copies. 35 Cents.**

PROFESSOR SOUPBONE, STATISTICIAN. A statistical monologue by Arthur LeRoy Kaser. **Copies, 25 Cents.**

A Book You Should Own

MODERN MAKE-UP. By Leslie H. Carter. The most complete and practical book published on the art of make-up. **Postpaid, $1.35.**

Catalogue World's Best Entertainments Free

BANNER PLAY BUREAU, Inc.

111 Ellis Street
San Francisco, Calif.

137 West 4th Street
Cincinnati, Ohio

Outstanding

In Performance
In Design
In Value

The Electrograph Recording Instrument

(FOR MAKING PERSONAL
PHONOGRAPH RECORDS)

At every public demonstration, where records made on all the standard recording instruments were represented, the superior quality of the Electrograph was clearly proved.

It is the choice not only of the leaders in all branches of education, but is by far the most widely used instrument in the fine professional studios.

It is the most modern in design and construction. The very latest in amplifier and cutting engineering is to be found in my instrument. Every single part has stood the test of actual usage. No other manufacturer builds into his instruments the experience that results from thousands of recordings made under almost every condition at schools, radio stations, assemblies, etc., in many parts of this country, and every week hundreds of fine professional recordings are made on my instruments in the leading New York studios.

The Electrograph represents the greatest value for your money. The price is no higher but it is easily the leader in performance, easy operation, durability and compactness. It is portable, and the entire weight is under 100 pounds with the heaviest unit under 50 pounds.

All this experience has been incorporated into a booklet that will be worth reading before you purchase any recording instrument. You may also have the complete specifications for the asking.

Here is a List of Those We Serve

Columbia
Yale
Princeton
Harvard
Teachers College of Columbia University
College of the City of New York
Carnegie Institute of Technology
University of Wisconsin
Chicago University
Northwestern University
State University of Iowa
Ohio State University
Denison University
Muskingum College
University of Louisiana
Pennsylvania State College
Danbury Teachers College
New Haven Teachers College
Vassar College
Wheaton College
Mount Holyoke College
Wellesley College
Barnard College
Skidmore College
Library of Congress
University of Virginia
Linguistic Atlas of the U.S. and Canada
American Folk Song Society
Shorewood Public Schools
Byrd Exposition to the South Pole
Straus Expedition to West Africa
Columbia Broadcasting Co.
National Broadcasting Co.
Standard Brands Inc.
Eastman School of Music
Hello World Broadcasting Co.
Central Institute for the Deaf
Oberlin College
New School for Social Research
Roanoke College
Washington University

And many public and private schools.

Walter C. Garwick

SOUND RECORDING INSTRUMENTS

250 W. 54th Street **New York**

State & National Winning Readings

Here are some of our readings that have recently won State or National High School Declamatory Contests:

HUMOROUS READINGS

AT THE DECLAM CONTEST
Won a State Contest and Second in National
Leota Hulse Black

AT THE SCHOOL EXHIBITION
J. L. Harbour

AT THE SWIMMING POOL
Won Four State Contests and One Inter-state
Clara Lewis Seeman

BROTHERLY LOVE
Won Four State Contests and One National
Leota Hulse Black

BROTHERS BEREFT
Leota Hulse Black

BROTHERS-IN-LOVE
Leota Hulse Black

CHINA BLUE EYES
Won Seven State Contests

DEDICATING THE CROUTVILLE GAS STATION
Kathryn Wayne

THE HOME TALENT REHEARSAL
Won Two State Contests
J. L. Harbour

JIMMIE JONES STUDIES GEOGRAPHY
Alma Prudence Foss

KING MIDAS IN A MIX-UP
Kathryn Kimball

LADIES AID AT THE LOCAL THEATRE
J. L. Harbour

LET BROTHERLY LOVE CONTINUE
Won Four State Contests and One National
Leota Hulse Black

MRS. SCHNICKLEFRITZ UND DER FOUR O'CLOCK TRAIN
Gracia Stayton

OPEN WIDER PLEASE
Won Two State Contests
Carol Houghton

THE SCHOOL PROGRAM
Won Four State Contests and One National
J. L. Harbour

TOMMY STEARNS AT THE LIB'ARY
Clara Lewis Seeman

UNDER THE BIG TOP
Leota Hulse Black

THE WIDOW'S MITES
Leota Hulse Black

DRAMATIC READINGS

THE CRIMSON RAMBLER
Kathryn Kimball

DADDY DOC
Kathryn Kimball

FEAR GOD AND TAKE YOUR OWN PART
Won Two State Contests
Myron Brinig

THE HIGHWAYMAN
Won Two State Contests
Alfred Noyes

KING LEAR'S DAUGHTERS
William Shakespeare

THE LITTLE KING FINDS PEACE
Kathryn Kimball

THE MURDER OF KING DUNCAN
(From Macbeth)

ROMEO AND JULIET
Won Two State Contests
William Shakespeare

THE SACRIFICE OF SIDNEY CARTON
Won Two State Contests
Charles Dickens

THE WHITE HANDS OF TELHAM
Won Three State Contests and One Inter-state
Samuel R. Davenport

ORATIONS

ALL EMBRACING AMERICANISM
Won Two Tri-state Contests
Hon. William D. Upshaw

THE CHALLENGE OF CRIME
A. B. Cunningham

THE CONSTITUTION
Won Two State Contects
Herbert Wenig

CRIME IT'S OWN DETECTOR
Won the National Contest in 1932
Daniel Webster

IN MEMORY OF OUR HEROIC DEAD
Senuator Frank B. Willis

MASTERFUL MAN OF THE AGES
Won Four State Contests
Hon. John M. Robsion

THE PARADOX OF PEACE
Won a State Contest and Second in National
Willard Wirtz

THE PLEA FOR CUBA
Won Two State Contests

ROPES
Won Nine State Contests and One Tri-State
Stanford Clinton

SOLEMN LOOKING BLOKES
Stacy Aumonier

THE SOUL OF THE AMERICAN SOLDIER
Hon. Thomas T. Schall

THE SUPREME MENACE
Won Six State Contests and Two National
Earl M. Dunbar

THE UNKNOWN SOLDIER
Won Two State Contests
Bruce Barton

In our catalog of Readings, Plays, Entertainments, you may find described these and other state winners. Catalogs free.

WETMORE DECLAMATION BUREAU

1304 South Newton Ave., Sioux City, Iowa

DEPARTMENT of SPEECH

Louisiana State University

Regular Session.....Sept. 19, 1934 to June 3, 1935

CURRICULUM

Speech Fundamentals
Phonetics
Voice Science
Acoustics
Speech Pathology
Speech Correction
Clinical Practice
Interpretative Reading
Story Telling
Marionette Drama
Radio Speaking
Public Speaking
Debate
Persuasion
The Literature of Oratory
Acting
Play Direction
Play Production
Play Writing
Commedia dell' Arte
Dramatic Literature
Stagecraft
Costume Design
Stage Lighting
Speech Psychology

EQUIPMENT

Beautiful new building
Completely equipped modern university theatre
Workshop theatre
Greek theatre seating 3,000
Phonetics laboratory
Research laboratory
Stage lighting laboratory—miniature stage and lights
Speech correction clinic
Examination room — diagnostic equipment
Suite of sound-proof rooms
Shops — Wardrobe — Marionette stage

ACTIVITIES

72 Workshop productions a year
5 Full-evening productions
Marionette plays
Choral reading
Debate tours
Dramatic tours
Public recitals
Clinical work

DEGREES

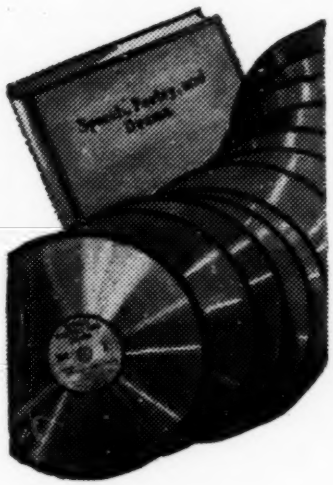
A.B., M.A., Ph.D., Major in Speech

Visit historic Louisiana. See old New Orleans and the French Quarter; the Têche country and Evangeline Oak; the Gulf coast Riviera; cane fields, rice swamps; cypress-bordered bayous, moss-hung live-oaks, orange groves, fig trees; year-round succession of camellias, azaleas, crepe myrtle, cape jasmine and roses. Attend Mardi Gras. Enjoy winter in the Southland.

Write for Catalogue and Information

ADDRESS C. M. WISE, BATON ROUGE, LA.

Animate Your Teaching



Use these splendid phonograph interpretations to reveal the author's spirit and thought, to give students a new interest in poetry and drama through emotional appreciation, to glorify the music and beauty of English words and phrases, to create a desire to find the joy of life in literary masterpieces . . . .

PRICES: The text lists at $1.20 and the 12 records at 50c each or $6.00 for the full set. The regular school discount will apply on all orders for the textbook and on orders for the complete set of 12 records. The price of single records is 50c net.

Sent on approval. Address our nearest office.

The Gregg Publishing Co.

New York Chicago San Francisco Boston Toronto

ARCHIVES OF SPEECH

A Journal of Research

Published in January, 1934, Volume I, Number 1. Price, $1.50

STUDIES IN EXPERIMENTAL PHONETICS

Edited by
JOSEPH TIFFIN, PH.D.

A PHONOPHOTOGRAPHIC STUDY OF TRAINED AND UNTRAINED VOICES READING FACTUAL AND DRAMATIC MATERIAL — *Gladys E. Lynch*

STUDIES IN NASALITY — *Joseph P. Kelly*

A PSYCHOPHYSICAL STUDY OF INDIVIDUAL DIFFERENCES IN SPEAKING ABILITY — *Don Lewis and Joseph Tiffin*

AN ANALYSIS OF SOME BASIC ASPECTS OF EFFECTIVE SPEECH — *Elwood Murray and Joseph Tiffin*

A CONTRIBUTION TO THE X-RAY STUDY OF TONGUE POSITION IN CERTAIN VOWELS .... — *J. P. Kelly and L. B. Higley*

In Preparation

STUDIES IN TEACHING OF SPEECH

Edited by
E. C. MABIE and L. E. TRAVIS

A Diagnosis of the Speech Needs and Abilities of Freshmen in a Required Course in Speech Training at the State University of Iowa. *Harry Grinnell Barnes.*

Case Studies of Changes in Social Behavior and Emotional Attitudes of High School Students Participating in Dramatic Art. *Dina Rees Evans.*

STUDIES IN PUBLIC SPEAKING

Edited by
A. CRAIG BAIRD, LITT.D.

The Development of the Theory of Homiletics in England from 1534 to 1692. *Marsee F. Evans.*

A Survey and Analysis of American Homiletics Prior to 1860. *Floyd W. Lambertson.*

Jermiah Sullivan Black as a Forensic Speaker. *W. N. Brigance.*

The Oratorical Practice of Albert J. Beveridge. *Herold T. Ross.*

An Analysis of the Oratory of John Bright. *Lester W. Thonssen.*

The Preparation of Burke for his American Speeches. *H. Clay Harshbarger.*

Archives of Speech provides a channel for the publication of reports of research. Volumes will be issued not at regular intervals but at such times as the accumulation of material and funds make publication desirable. Numbers will be devoted to homogeneous material dealing principally with phonetics, speech pathology, historical and critical studies in oratory and dramatic art and experimental studies in methods of teaching speech. Numbers will vary in size and in plan according to the demands of the research reported. Volumes will be closed with the publication of approximately five hundred pages. Subscription rates are five dollars per volume. Single numbers will vary in price according to the cost of publication and the size.

Correspondence concerning subscriptions and manuscripts should be addressed to the Managing Editor, Edward C. Mabie, University of Iowa, Iowa City, Iowa.

ARCHIVES OF SPEECH

A Journal of Research

Published through the coöperation of the following members of the staff of the Department of Speech, State University of Iowa, Iowa City, Iowa

A. CRAIG BAIRD — JOSEPH TIFFIN
LEE EDWARD TRAVIS — EDWARD C. MABIE

NOW IN PRESS

Volume I, Number 2

Studies in Speech Pathology

Edited by LEE EDWARD TRAVIS, Ph. D.

An Action Current Study of Muscle Contraction Latency, With Special Reference to Latent Tetany in Stutterers *Rolland Shackson*

A Study of Breathing and Vocal Disturbances of Stutterers *E. H. Henrikson*

The Motor Capacity of Stutterers *Hildreth Marie Cross*

A Study of the Horizontal Dysintegration of Breathing During Stuttering *Vera Travis*

The Relation of Malocclusion to Articulatory Speech Defects *Lloyd H. Fymbo*

A Self-Analysis of a Case of Reading, Writing and Speaking Disability *Roberta Vae McKnight*

An Analysis of the Speech Difficulties of 56 Cleft Palate and Harelip Cases *Lois H. Cobb*

Effect of Upper Respiratory Affections on Speech *Lois H. Cobb*

The Relationship Between Mirror Reading and Stuttering *Clarence A. Peters*

The Relationship Between Psychological Factors and the Severity of Stuttering *Max Davis Steer and Wendell Johnson*

A Case History Analysis of Stutterers, Former Stutterers and Normal Speakers With Changed Handedness *Robert Milisen and Wendell Johnson*

An Analysis of Precedence of Motor Lead in Homologous Structures in Stutterers and Normal Speakers *Lee Edward Travis, W. W. Tuttle and W. Ralph Griggs Bender*

GISLASON'S
The Art of Effective Speaking

A TEXTBOOK FOR college classes. Thorough in scope, lively but dignified in style, and sound in its application of modern psychological principles.

NOTEWORTHY FEATURES: A wealth of illustration. Emphasis on practical speech-making with particular attention to motivation and suggestion. Every principle clearly enunciated and concretely linked up with great speeches.

CHAPTER HEADINGS: The Value of Speech Training. The Speech Situation. Choosing a Subject. Finding and Recording Speech Materials. Speech Organization: The Outline. Preparation for Delivery. Forms of Support. Illustrations. Motivation: Want Appeal. Motivation: Suggestion. The Speaking Style. Kind of Speeches. The Informative Speech. The Impressive Speech. The Argumentative Speech. The Entertainment Speech. The Occasional Address. What Holds Attention. Action: Gesture, Posture, Movement. Voice: Pronunication, Enunciaton. *Appendixes*: Suggestions for Criticism of Speeches. Specimen Speeches. Selections for Practice. Compilations of Speeches.

502 pages Price $2.48

Recent Heath Texts in Public Speaking

GISLASON: The Art of Effective Speaking. 502p. $2.48
HORNER: Elements of Public Speech. 324p. 1.80
MONROE AND LULL: Projects in Speech for a Foundation Course. 173p. ..... .80
REEVES: Parliamentary Procedure. 112p. ..... .64

D. C. HEATH & COMPANY

BOSTON NEW YORK CHICAGO ATLANTA
SAN FRANCISCO DALLAS LONDON

UNIVERSITY *of* MICHIGAN

Department of Speech and General Linguistics

1934-1935

Regular Session—September 24 to June 17
Summer Session—June 24 to August 16

SPECIAL OPPORTUNITIES FOR TEACHERS OF SPEECH, DIRECTORS OF DRAMATIC ART, AND FOR THOSE ENGAGED IN FUNDAMENTAL RESEARCH AS A PART OF THE DOCTORATE OR A POST-DOCTORATE PROGRAM.

COURSES

Fundamentals of Speech, Public Speaking, Advanced Public Speaking, British and American Orators, Speech Composition, The Teaching of Speech, Pro-seminar in Speech, Seminar in Rhetoric and Oratory, The Theory and Practice of Argumentation, Debate, The Teaching and Coaching of Debate, Theory of Speech Composition and Debate, Oral Interpretation, Oral Interpretation of Shakespeare, Oral Interpretation of Modern Drama, Oral Interpretation of Poetry, The Lecture Recital, Theory of Oral Reading, Elements of Play Production, Elements of Stage Production of Musical Comedies and Operettas, Acting, Stagecraft, Directing, Advanced Dramatic Production, Costuming, Advanced Stagecraft, Seminar in Dramatics, Introduction to the Science of Language, Introduction to Speech Science, Psychology of Language and Speech, Introduction to Phonetics, General Phonetics, Dynamic Phonetics, English Phonetics, Hermeneutics, Comparative Philology, Voice Science, The Study of Speech Disorders, Clinical Methods in Speech Correction, Seminar in Phonetics, Seminar in Voice Science, Anatomy and Function of the Vocal Organs, Seminar in Etymology and Semantics, Methods and Problems in Linguistic Science, General Course in Experimental Phonetics, Introduction and Practice in Radio Speaking, Radio Reading and Dramatics, Broadcasting Technique, Stage and Radio Diction.

THE MICHIGAN REPERTORY PLAYERS

Students enrolled in courses in Theater Arts will stage a group of plays during both sessions as a laboratory for class work—giving full opportunity for the study of all phases of theater arts—acting, directing, stagecraft.

ANNOUNCEMENTS

For Bulletin of General Information and Announcements for the Regular Session, address Mr. Ira M. Smith, Registrar of the University.

Our departmental catalog for the Summer Session, giving in detail all of the courses and projects of the Department for the 1935 Summer Session will be ready for distribution in January. For a copy of this catalog, write to Dr. L. M. Eich, Secretary of the Summer Session, University of Michigan, Ann Arbor, Michigan.

DEPARTMENTAL INFORMATION

Letters in regard to courses, requirements for degrees, and other departmental matters should be sent to Professor Henry A. Sanders, Chairman of the Department of Speech and General Linguistics, University of Michigan, Ann Arbor, Michigan.

Have You a Complete File

of

The Quarterly Journal of Speech?

When the present limited supply of Journals is exhausted, it will be impossible to obtain back issues of The Quarterly Journal of Speech.

For a short time only, we will continue to accept orders for available back issues at the following reduced rates:

Single Copies of The Quarterly Journal of Speech	$ .60
2 Copies, if ordered in one shipment	1.00
3 Copies, if ordered in one shipment	1.40
4 Copies, if ordered in one shipment	1.75
5 Copies or more, if ordered in one shipment, each	.40

You cannot afford to miss this opportunity to secure the numbers which you need for study and reference.

Make your selection and send in your order today while the forty-eight issues listed in this announcement are still available.

A Table of Contents will be sent upon request.

- - - -